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EFFECTS OF THE PHYSICAL ENVIRONMENT ON SOCIAL SUPPORT
AND THE STRESS RESPONSE

by

Raymond Fleming

Dissertation submitted to the Faculty of the department
of Medical Psychology Graduate Program of the Uniformed
Services University of the Health Sciences in partial
fulfillment of the requirements for the degree of
Doctor of Philosophy 1986



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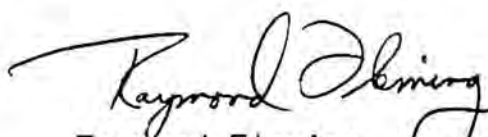
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A handwritten signature in black ink, reading "Raymond Fleming". The signature is fluid and cursive, with a large, sweeping initial "R" and a stylized "F".

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ABSTRACT

Title of Dissertation: Effects of the Physical Environment on Social Support and the Stress Response

Raymond Fleming, Doctor of Philosophy, 1986

Dissertation directed by: Andrew Baum, Ph.D., Department of Medical Psychology

This study examined the effects of architectural arrangement on social support and the stress response. Two types of architectural design were studied: a design facilitative of social interaction, where apartment buildings were arranged in a court-like pattern with apartments facing one another, and a design which was not facilitative of social interaction, where apartment buildings were arranged on streets with open fields or businesses, rather than apartments, opposing them. The major hypothesis of this study was that the court design would facilitate greater use of space surrounding the apartments and that differences in the use of this space would lead to greater friendship formation and perceptions of support from neighbors in the court-like design.

Seventy-two subjects participated. The housing authority assigned subjects to the two architectural layouts randomly and subjects were similar on all major demographics. Subjects were visited in their homes by an experimenter and completed questionnaires measuring levels of stressors experienced, satisfaction with their neighborhood, and stress

responding (self-reported symptoms). Subjects also completed a behavioral performance task (proofreading) and endocrinological measures of sympathetic nervous system arousal were obtained. Several measures of social support (e.g., perceived emotional support, perceived neighbor support, and a support network inventory) were obtained. Experimenters performed behavioral mapping procedures on ten separate occasions in order to observe differences in the use of the space surrounding the dwellings.

Residents of the court-like design reported greater perceptions of neighbor support and satisfaction with their neighborhood than did their counterparts in the design where apartments did not face one another. A greater percentage of social behaviors was observed in the court-like design during behavioral mapping. Results replicated previous findings concerning the relationship between perceived emotional support and the stress response. Levels of daily irritations (e.g., job dissatisfactions) were a better predictor of self-reported symptoms of distress than a measure of stressful life events experienced within the past year. Thus, the physical arrangement of space in a neighborhood can affect the way that space is used by its residents and, ultimately, how the residents feel about one another and the neighborhood in which they live.

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Table of Contents

Abstract.....	iii
Acknowledgement.....	vi
Chapter One - Background.....	1
The Stress Response.....	1
Illness as an effect of stress.....	5
Mediators of stress.....	6
Social Support.....	7
Types of support.....	10
Functions of support.....	12
Research findings.....	14
The Assets-Benefits Hypothesis.....	15
The Buffering Hypothesis.....	17
Psychosocial assets.....	18
Life events studies.....	20
Buffering: Interaction or conditional effects?...21	
Strategies for future research.....	23
Environmental determinants of social experience.....	27
Architecture and social behavior.....	31
Friendship formation and passive social contact.....	33
Use of space by groups.....	36
Semiprivate and defensible space.....	39
Control of social contact.....	40
Social support in the environment.....	44

The importance of local social support.....	44
Architecture and social support.....	47
Determinants of support.....	47
Sources of environmental stress.....	49
Design implications.....	52
Hypotheses.....	55
Chapter Two - Methods.....	57
Overview and design.....	57
Architectural Designs.....	55
Subjects.....	58
Procedure.....	59
Testing sessions.....	59
Behavioral mapping.....	60
Dependent Measures.....	62
Measurement of social support.....	62
Measurement of stressors	63
Measurement of stress responding.....	64
Experimenters.....	66
Chapter Three - Results.....	67
Measures of Stressors.....	67
Use of Neighborhood Space.....	67
Perceived Neighbor Support.....	68
Perceived Emotional Support.....	70
The Stress Response.....	72
Predictors of Neighborhood Satisfaction.....	74
Chapter Four - Discussion.....	77

Footnotes.....	85
Tables.....	87
Figures.....	96
Appendices.....	103
References.....	182

Chapter One - Background

The Stress Response

During the first two decades of this century, the autonomic nervous system and its component parts and functions were being documented. In 1911, Cannon and de la Paz first demonstrated that the adrenal gland secreted a vasoactive substance (sympathin) which has become known as epinephrine. This discovery led Cannon to very detailed investigations into the function(s) of the sympathetic nervous system and finally to his delineation of the "fight or flight" response (Cannon, 1914; 1928; 1936).

In outlining the "fight or flight" response, Cannon listed many accompanying physiological changes which were thought to facilitate either fighting or fleeing. These changes included increased cardiovascular response (arterial pressure, heart rate, myocardial contractility), increased respiration, increased blood flow to the major striated muscle groups (and concurrent decreased blood flow to organs not needed for rapid activity), increased muscle strength and increased sweating. All of the above changes were explained in terms of a Darwinian framework, which noted their utility in preparing the organism to defend itself or flee from a threat. And, all of the above responses to stress were autonomic changes observed during states of pain, hunger, fear, and rage. Epinephrine has been shown to

prolong these autonomic fluxes (Guyton, 1976) and has thus been recognized as being of major importance to the "fight or flight"/stress response.

Selye (1936) noticed what he referred to as the nonspecific response to injury. This discovery came as he was studying the effects of sex hormones in rats. While injecting rats with his "extracts," Selye recognized that no matter how pure he made his injections, the rats developed a triad of responses to the solutions. The triad consisted of enlargement of the adrenal glands, involution of the thymicolympathic system, and gastric ulceration and bleeding. It was soon discovered that this was a nonspecific response to injury that occurred in response to almost any noxious or aversive event. This is what has come to be elaborated upon as the General Adaptation Syndrome (GAS).

The GAS consists of three stages of reaction to aversive stimuli: alarm, resistance and exhaustion. In the alarm stage, the organism responds to the noxious stimulus with enhanced adrenocortical activity, releasing both pro- and anti-inflammatory corticosteroids. This stage is relatively short in duration and is replaced by the stage of resistance. During the resistance stage, the organism does not display any overt signs of hyperreaction to the intruding stimulus and appears to have adapted to it. The final stage, exhaustion, is marked by a reappearance of signs of the organism's struggle to adapt to the stimulus. It is during this stage that Selye believed that the "diseases of adaptation" (e.g., hypertension) occurred. The stage of exhaustion ends in the

death of the organism.

Seyle presents important information concerning the response to stressors. He argues that the response to stress is nonspecific (always consisting of the triad and the GAS) and he provides a link between stress and disease or illness. Although the notion of nonspecificity of response to injury has been questioned (see Mason, 1975), the general concept of a response to stress has received enormous attention. Seyle's focus was on the pituitary-adrenal-cortical axis, emphasizing the anti-inflammatory actions of corticosteroids (especially cortisol) in response to injury, and very little attention was paid to the influence of central appraisal mechanisms in this generalized response.

Lazarus (1966) has brought the appraisal process into the picture (of the mediation of the response to stress), but his theorizing is almost as exclusively psychological as Seyle's was exclusively physiological. Even so, the compatibility between these two theoretical perspectives seems clear.

Lazarus (1966) pointed out that stress has an important psychological component. Not all stress experiences will be psychological - there is very little that is psychological about infection. Yet, there are many stressors that are psychological, at least in part (i.e., they rely on interpretation for any effect). The ways in which stressors such as the loss of a spouse or failing an examination affect us are mediated, to a large extent, by psychological

processes (e.g., Kasl and Cobb, 1970; Frankenhauser, 1978).

Appraisal is central to Lazarus' theory. He suggests that virtually the only way for a stimulus to be a stressor is for it to be appraised as threatening or involving harm or loss for the perceiver (Lazarus, 1966). Appraisals of threat or loss lead to stress and the need for a coping response to the situation. This coping response, or secondary appraisal, can lead to two basic forms of coping. Direct action coping involves interaction with the stressful stimulus in such a way as to change the situation (e.g., if something breaks, you fix it). Palliative coping involves manipulation of one's emotional response to a threatening situation (e.g., trying not to let the threat bother you; thinking of other things). Secondary appraisal is thus focused on adapting to the stressor - coping with it.

The negative effects of stress may be expected to appear when coping is inadequate. When this occurs, adaptation to the stressor is incomplete and may be manifested behaviorally. These manifestations of reaction to the stressor may occur during exposure to the stressor. In this case, the responses are referred to as stress "effects." If the reaction to the stress continues after the stressor is no longer present, then the reaction is termed an "aftereffect." Glass and Singer (1972) discuss the "aftereffects" of exposure to loud noise. They found that subjects who were led to believe that they could shut off the loud noises if they became unbearable performed better on a concentration task (i.e., a proofreading task)

after the cessation of the noise. They hypothesized that the perceived control over the noise was sufficient to mitigate its aftereffects.

The stress response involves not only psychological upset, but also includes the physiological "readying" processes that have been described by Cannon (1936). Research on the stress response has become more interdisciplinary (Baum, Grunberg, and Singer, 1982). In general, we have come to a more integrative notion of the stress response which includes not only the physiological and psychological domains, but also the behavioral domain as well.

Illness as an Effect of Stress Responding

The relationship(s) between the stress response and illness has been suggested (Gruchow, 1979; Mason, Buescher, Belfer, Artenstein, and Mougey, 1979). The basic assumption, here, is that stress leads to increasing levels of circulating catecholamines and that this leads to depressed immune functioning. Studies of upper respiratory viral infections and stress have noted the coincidence of a spike in catecholamine levels a few days prior to the onset of illness symptoms (e.g., fever, cough, aches). This relationship is correlational and must be viewed with caution, since these studies may be picking up the onset of a sympathetic response to illness preceding any overt signs of infection.

Other research has focused more specifically on the relationships between circulating catecholamines (and other

hormones) and lymphocyte functioning (Ahlquist, 1976). Researchers have drawn links between the functioning of the sympathetic nervous system and immune function and these suggestions have helped to provide a basis for hypotheses concerning the link between stress responding and illness (Ader, 1981; Rogers, Dubey and Reich, 1979; Stein, Schiavi, and Camerino, 1976). Simply stated, enhanced sympathetic nervous system activity has been linked to decreases in immunocompetence. Thus, stressed individuals may be more susceptible to infections due to this decreased capacity of immune function.

Mediators of Stress

Coping with a stressor has been shown to be facilitated by a number of variables. For instance, control has been extensively studied for its effects in mediating the stress response (Glass and Singer, 1972; Rodin, Rennert, and Solomon, 1980). It has also been shown that the loss of control may be regarded as stressful (Baum and Valins, 1977) and that even the illusion of control is powerful in mitigating the effects of stress (Glass and Singer, 1972; Langer, 1975).

Attitudes related to appraisal have also proven to be effective mediators of the stress response. For example, Jonsson and Sorenson (1977) have shown that giving subjects either a positive or negative induction to airport noise can affect their perceptions of the noise as bothersome. Also, Sundstrom, Lounsbury, DeVault and Peele (1981) have indicated that negative attitudes toward a nuclear power

plant related to perceptions of hazards related to the functioning of the plant.

Evidence suggests that the relationships that one has with others can mediate the stress response (Cobb, 1976; Cassel, 1976). Loved ones, friends and neighbors can provide aid in coping with stressful situations. This aid may take the form of tangible assistance (e.g., direct assistance in solving the problem) or may be manifest as emotional support and understanding. Others may be one's best resource in dealing with a stressful situation and the relationship of social support to stress is crucial. This dissertation focuses on these social relationships, how their formation may be influenced by the physical environment, and the effects they may have on the stress response.

Social Support

Some of the earliest work on the effects of not having adequate social support was the investigation of suicide by Durkheim (1951). He demonstrated how interpersonal relationships can affect one's behavior, in that those persons experiencing anomie were the most likely candidates for suicide. This work was the first to clearly establish the supportive nature of interpersonal relationships, and in doing so it led to a new understanding of the ways that social interactions can influence one's life. In the 1950's, Festinger proposed his theories of social comparison and cognitive dissonance (Festinger, 1954; 1957), and along

with these theories came propositions that others may play a substantial role in the reduction of dissonant cognitions.

Thus, we are influenced powerfully by those around us. He also elaborated upon the ways that social interactions lead to the opportunity for opinion validation and social comparison and how this process could lead to the reduction of dissonance. Essential to his theorizing is the notion that people are motivated to reduce or eliminate drives associated with dissonant cognitions and to validate their opinions, beliefs and feelings through comparison with similar others.

Even the way we view the environment will be influenced profoundly by those who are close to us. Festinger (1954) cites instances where persons who had experienced an earthquake looked to others in order to assess the environment and to tell whether the worst was over or if more destruction was forthcoming. In this instance, social interaction was seen to validate through rumors individuals' estimates of what was likely within their environment. Festinger showed that two types of rumors developed: excitatory and calming. Dependent upon the type of rumor which circulated, people were more or less frightened about the possibility of destruction in their area. This may have led to stress for persons hearing excitatory rumors and to a reduction of stress for persons exposed to calming rumors. Thus, Festinger provides a real life example of how social comparison through rumors may affect one's appraisal of a situation.

Another example is provided by Schachter (1959), who conducted studies of affiliation. This research showed that people preferred to wait with similar others when threatened (with electric shock). Schachter proposed that individuals could deal better with the uncertainty and anxiety created by the threat by choosing to wait with a group of others. He hypothesized that the anxiety led to a need for social comparison of one's feelings. This "affiliative need" was postulated to lead to anxiety reduction via social comparison by motivating individuals to affiliate. Waiting in a group served as a means of support for the subject - as Festinger notes, "...it seems clear that the drive for self-evaluation is an important factor contributing to making the human being 'gregarious.'" (p. 136)

Research on social support derives from several disciplines (e.g., anthropology, sociology, psychology) and a number of theories, however, much of the research concerns the process of social comparison. Although there are literally dozens of definitions for "social support" circulating in the literature, most include emotional support, tangible assistance, and informational components. That is, social support is seen as providing any one or a combination of these three.

We can be thought of as having emotional support if there is someone that we can turn to when things are troubling us. Tangible assistance can be derived from persons who are not close to us and includes financial

assistance in dealing with a problem, or aid in solving a problem (e.g., assistance in fixing one's car). Persons can receive tangible assistance from the same source(s) as for emotional support or may receive tangible aid from an organization (e.g., a bank) or even a stranger (e.g., help restarting one's car). Informational support may be thought of as aid in understanding a problem. For instance, rumors which circulate in times of disaster may help to define the situation for the individual and thereby reduce ambiguity and uncertainty.

Cobb (1976), in an address to the American Psychosomatic Society, defined support in terms of benefits associated with feeling loved and valued, and with being a member of a "network of communication and mutual obligation." His conception was that the encouragement, opinion validation, and reassurance that people get from friends and family influence their response to stress and somehow make them more resistant to its effects. Some research has indicated that during periods of stress or life change people manage better when they can derive support from social relationships (Cobb, 1976; Cohen and McKay, 1984; Kaplan, Cassel and Gore, 1977).

Types of Support

Social support has been categorized in a number of ways. Some researchers have focused on the distinction between quantitative and qualitative aspects of support (Donald, Ware, Brook, and Davies-Avery, 1978). The difference here derives from varying operationalizations of the concept

of social support. Social supports can be measured in terms of amount of social contact (i.e., the number of persons one has available to interact with) or in terms of quality of contact (i.e., the usefulness of the interactions to the person). For example, Miller and Ingham (1976) found that women with a greater number of acquaintances report fewer physical symptoms than women reporting having fewer acquaintances. This is an instance where mere "counts" of social supports was predictive of symptom reporting. Alternatively, Medalie and Goldbert (1976) reported that among highly anxious men, those who perceived their wives as more supportive showed a lesser incidence of angina pectoris. This study relied on perceived support as its predictor variable rather than a "counts" measure. In short, widely variant approaches have been used to assess social support and have sometimes resulted in contradictory findings. Researchers focusing on the quantitative aspects of support tend to measure numbers of contacts, or to develop coding schemes for analyzing networks of support relationships (Eckenrode and Gore, 1981). Others focus mainly upon measures of perceived availability of social support and perceived adequacy of support (Fleming, Baum, Gisriel, and Gatchel, 1982).

A distinction can be drawn between emotional aspects of support (e.g., reassurance, comfort) and instrumental aspects of support (e.g., tangible assistance). Lin, Dean and Ensel (1981) have demonstrated that emotional and

informational support are highly correlated, while tangible assistance remains distinct. Thus, two major types of support have been delineated: instrumental support and emotional support.

Functions of Support

Another important issue concerns the function(s) of social support. Dozens of studies have demonstrated the relationship between social support and stress responding, but theorizing about the underlying mechanisms responsible for this relationship is relatively rare. Wallston, Alagna, DeVellis, and DeVellis (1983) have listed three ways in which social support may affect health. First, social support may directly remove the threat (e.g., financial assistance might allay fears of someone in need of money) or at least reduce it. This suggests that social support may change parameters within the environment which are threatening to the individual. Second, support from others can be effective in changing perceptions of threat, via dissonance reduction or social comparison for example, such that the consequences of the threatening stimulus are lessened for the individual. Third, support from others may increase one's sense of control, which could in turn reduce the consequences of a threat (see Glass and Singer, 1972).

It has also been suggested that social support must be appropriate to the specific threat and the needs of the recipient (Cohen and McKay, 1984). Although financial support may benefit an individual experiencing money-related troubles, it may be of little benefit to offer money to

someone grieving the loss of a loved one. The reverse may also be true. Lending a sympathetic ear to someone facing bankruptcy may not be as effective in reducing the threat as lending that person the necessary cash to solve his or her problems. (However, in that lending an ear may affect appraisal or control, one would expect this also to be of some help.) The realization that specific types of social support may be of benefit in some instances and not in others is at least partly related to the problem of measurement.

Several problems exist in the social support literature which limit the findings of much research. Most studies of the role of social support in the response to stress focus on self-reported symptomatology as the major (or only) dependent measure. While self-reported symptoms give one perspective of the stress response, they are open to a number of biases which limit the generalizability of findings based solely on self-reported data (Baum et al., 1983). It would be better to document the existence of stress using more than one mode of measure (i.e., combinations of self-report, behavioral, and physiological measures). This could give a more informative description of the individual's response and may lead to better prediction of the relationships between social support and stress.

Parallel problems exist in the measurement of social support. For example, measures of social support focusing

only upon direct counts of social interactions cover only aspect or type of support and ignore the meaning behind the contacts. Greater numbers of social contacts are taken as an indication of greater social support for the individual, however, more contacts do not necessarily indicate better support. The quality of the social interactions that one engages in may be just as important as the number of interactions. Therefore, including measures of perceived support or perceived adequacy may be expected to increase the ability to predict the relationship between social support and stress. Cohen and McKay (1984) refer to these perceived social support measures as functional measures of support and they have had success in finding effects of social support within the extant literature when studies use this type of measure.

Wallston et al., (1983) have noted that the literature on social support suffers from a over-reliance upon retrospective self-reports, from which no direction of causality can be inferred. As Thoits (1981) has noted, the operationalization and conceptionalization of studies on social support and stress are too often inadequate. Few studies distinguish between types of support used. Thus, reports of social support are often combinations of instrumental and emotional support and do not often use scales with known reliability and validity.

Research findings

There are two general hypotheses within the social support and stress literature concerning the function of

social support. The first, which has been called the "assets-benefits" hypothesis (Fleming et al., 1982) predicts main effects for social support. The second hypothesis predicts interaction effects between stress and social support (for a review, see Cohen and McKay, 1984; Dean and Lin, 1977). This is referred to as the "buffering" hypothesis. However, interaction effects do not preclude main effects and proponents of the buffering hypothesis do not exclusively deny main effects for social support. The difference between the two hypotheses may be seen as one of focus. In some circumstances, one might predict main effects of social support and in others one would expect interactions to appear. Insistence on only one of the two hypotheses as being useful may reflect a narrow focus.

The Assets-Benefits Hypothesis

Bradburn and Caplovitz (1965) report that high affiliators show greater avowed happiness than low affiliators. This is consistent with the notion that social support may be beneficial to the individual even when not under stress. Research has also indicated that general benefits such as longer life and better health are associated with higher levels of support (Berkman, 1977; Cassel, 1976). However, these benefits could be due to direct, positive effects of social support or may be due to the indirect effects of social support in lessening the effects of stress (as we will see later). Whether social supports operate in this manner is still open to question,

primarily due to insufficient testing of this hypothesis.

A second part of the assets-benefits hypothesis states that lack of social support is bad or stressful in and of itself. Studies of bereavement have pointed to devastating health effects of losing a loved one. Studies indicate depressed immune functioning (Bartrop, Luckhurst, Lazarus, Kiloh, and Penny, 1977), general susceptibility to illness and infection (Holmes and Masuda, 1974) and greater mortality (Kraus and Lilienfeld, 1959) in grieving individuals. Lack of social support can be thought of as a stressor and effects of lack of support can be attributed to stress responding. Gans (1962) studied the disintegration of neighborhoods in Boston as a result of urban renewal efforts. He noted that the support networks, which had been extensive while the neighborhoods remained intact, dissolved and left many residents of the area experiencing a sort of grief reaction. Fried (1963) agrees with Gans' analysis and reports that depression and physical symptoms remained in several relocated residents up to two years after the move. These consequences are attributed to grieving for the lost neighborhood and friends rather than to aspects within the new neighborhood.

Gruenberg (1967) has described what he refers to as the "social breakdown syndrome" in mental patients. This research focused on how mental patients give up and begin to adapt to institutional life after their social support networks fail them. This formulation is similar to Seligman's learned helplessness, in which noncontingency is

learned and lack of response is manifested. Gruenberg (1967) attributes much of the necessary institutionalization of mental patients to the effects of losing the support of family, friends, and community.

"Striving sentiments" have been described by Leighton (1959) as needs which, if not met, can lead to psychiatric disability. Changes in social relationships can lead to difficulty in meeting these needs and thus may lead to psychiatric complications. Segal, Weiss and Sokol (1965) have noted that there is a greater morbidity (psychiatric utilization) for individuals who do not affiliate as much as others. And, Langer and Michael (1960) find a crucial distinction between having no friends and having one or more friends for mental health risks.

A direct relationship between level of social support and physical and mental health has not been clearly established. While many studies suggest a correlation between level of social support and psychological and physical health, there is no work which can support causal statements concerning the direction of this relationship. However, this remains an area for further study.

The Buffering Hypothesis

The buffering hypothesis states that social support mitigates the effects of stress but does not necessarily provide benefit in the absence of stress. There are a number of reviews of studies that show a buffering effect for social support on stress (Cassel, 1974a; 1974b; Cobb,

1976; 1979; Dean and Lin, 1977; Eckenrode and Gore, 1981; Cohen and McKay, 1984), and it has been fairly well established that having social support is beneficial when under stress. The following is a selected review of the most pertinent findings of this literature.

Psychosocial assets. Two studies on the relationship between social support and stress/illness have focused upon measures of psychosocial assets. According to Nuckolls, Cassel and Kaplan (1972), psychosocial assets refer to "psychological or social factors" which contribute to the ability to adapt to stress. In particular, they were interested in women's abilities to adapt to their first pregnancy. They used a scale representing the adaptive potential for pregnancy, which contains five categories of assets: self, marriage, extended family, social resources, and definition of pregnancy. Only two of the five subscales tap directly into social support, while the remaining subscales look at psychological functioning, characteristics surrounding the marriage (e.g., concordance of age, duration of marriage) and questions concerning the woman's feelings about the pregnancy.

Nuckolls and colleagues (1972) examined complications in pregnancy (e.g., Apgar rating of infant of less than seven, maternal systolic blood pressure greater than 139 and/or diastolic over 89 during both the labor and the post-partum periods, stillbirth) as a function of life change score (via the Schedule of Recent Events) and psychosocial assets rating. Their findings were impressive.

For women with high life change scores (Holmes and Rahe, 1967) for the two years before and during pregnancy, 91 percent of women with low psychosocial assets scores had one or more complications with their pregnancies, while only 33 percent of women with high psychosocial assets and high life change scores had one or more complications.

A second study examining at psychosocial assets used the Berle Psychosocial Assets index in chronic intrinsic asthmatics (DeAraujo, van Arsdell, Holmes, and Dudley, 1973). The Berle index has three subscales: patient history, patient's perceptions of family and interpersonal relations, and physician's rating (based on the patient's personality structure and attitudes towards his or her illness. One year after administering the Berle index, patients filled out the Schedule of Recent Events and physician's records were consulted for patient's use of bronchodilator medication for the preceding year. Results showed that patients with low life events scores used less medication regardless of the psychosocial assets score, but among patients with high life events scores, use of medication was only high if psychosocial assets were low.

Both of these studies support the buffering hypothesis even though their measures do not strictly represent social support. It is conceivable that overlap between measures of social support and psychosocial assets are operative in buffering stress, but this cannot be inferred from the few studies which exist and no study has

directly compared the two measures.

Life events studies. It is a very common procedure to use measures of stressful life events in order to categorize individuals as experiencing either high or low stress. In fact, these assessments reflect the general level of sophistication in stress measurement that has existed in the literature. Therefore, a substantial amount of research on the buffering effects of social support is represented by life events studies.

In a study of 720 adults, Myers, Lindenthal and Pepper (1975) investigated the relationship between life events and symptoms. Although they did not analyze their data in terms of social support, Eaton (1978) reanalyzed the study in just such a manner. Eaton employed a measure of social support which consisted of whether the subjects reported having friends, being married, and the like. Although this reanalysis could not be done on a social support measure, per se, Eaton used a regression approach to indicate the amount of variance that these "social support" items could account for in symptom reporting. Controlling for life events and psychiatric symptoms assessed in the beginning of the study, Eaton found that being married or living with at least one other person buffered symptom reporting.

Lin, Simeone, Ensel and Kuo (1979) looked at life events stress, social support and psychological impairment. They report on the life stress of 170 Chinese-Americans (all heads of households). This study employed a nine item

measure of social support and failed to show significant interactions between social support and life events for psychological symptom reporting. However, a comment by Boyce (1981) argues that the pattern of means reported in Lin and colleagues (1979) reveals a buffering effect. Those individuals who were under the most stress and who reported the highest levels of social support showed less psychological symptoms than would be expected from the remaining means.

Buffering: Interaction or conditional effects?

Cohen and McKay (1984) report on the results of a number of studies indicating buffering effects but without statistically significant interaction terms. In each of these studies the results are suggestive of a buffering hypothesis for social support, but the strength of these findings varies considerably. Cohen and McKay (1984) argue that two forms of the buffering hypothesis exist and can be supported with the current literature. The first form of the buffering hypothesis posits increased pathology for persons experiencing high levels of stress who also have low levels of support. Pathology is unrelated to stress and relatively low for persons with high levels of support. They call this the "strong" version of the buffering hypothesis and it is indicated by significant interaction effects between social support and stress. The "weak" version of the buffering hypothesis states that pathology may increase (for persons with high levels of

support) with increases in stress, but the increase must be less than in the groups with low levels of support.

 Insert Figure 1 about here

Andrews, Tennant, Hewson and Vaillant (1978) looked at how several forms of social support (e.g., crisis support, neighborhood support) affect scores on two symptom questionnaires. Although no interactions proved significant for these results, Cohen and McKay (1984) point out that the mean values for the social support versus stress 2 X 2 would yield a pattern similar to the "weak" buffering effect discussed by them. Similarly, Frydman (1981) presents data on a study using the same measures as Andrews and colleagues (1978) and shows significant interactions between social support and stress on "neighborhood support" in one of the two samples used. Of the remaining comparisons which did not show an interaction effect, (in both samples) three quarter show the patterns of means suggested by Cohen and McKay (1984) as reflecting the "weak" version of the buffering hypothesis.

Studies on the availability of a confidant show fairly strong support for the buffering hypothesis. Brown and Harris (1978) report on a study of life change stress and psychiatric disorder in women. They labeled women who had reported intimate ties with their husband or boyfriend as having high social support and women who had the support of a friend, sister or mother once a week as having low

support. Results showed that women experiencing high life stress and who had low support reported the greatest number of symptoms. Women who had experienced little life stress reported the least symptoms, regardless of their social support level. Another study (Fleming, et al., 1982) showed that the perceived availability of support was sufficient to buffer the emotional (e.g., self-reported symptoms of depression, anxiety) and behavioral (e.g., errors on an embedded figures task) effects of living near the Three Mile Island nuclear power station. Those subjects who reported that they had greater support responded similarly to controls while those at Three Mile Island reporting lower levels of support responded with greater stress (e.g., greater number of symptoms reported, fewer proofreading errors found on a timed proofreading task). Results consistent with these, concerning the availability of a confidant, have been reported by several researchers (Miller and Ingham, 1976; Habif and Lahey, 1980; Medalie and Goldbert, 1976).

Strategies for future research

There are a number of strategies which might prove beneficial if adopted by researchers interested in the effects of social support and stress. As has already been mentioned, researchers can start by adopting better methods of assessing stress responding (i.e., multi-modal assessment). Research concerning the influence of moderator variables, such as social support, on stress responding can

only be as good as their assessment of the stress response. Measurement of social support also suffers from confusion within the literature. Some research groups emphasize social networks and measures of actual social interaction, while others focus primarily upon perceived availability of social support and perceived adequacy of support. Still others use a combination of these two approaches. It has been suggested that social support may only buffer the effects of stress when that support is appropriate to the needs of the individual and to the demands of the situation (Cohen and McKay, 1984). This follows from Festinger's (1954; 1957) notion that social support serves the function of promoting social comparison and dissonance reduction. In this light, it may be advisable for researchers to carefully study the demands of the specific stressful situation before deciding upon a measure of social support. Since not all forms of social support may be operative (or even necessary) in a given situation, it would be fruitful to measure those aspects of social support that are important to the situation at hand.

Another relevant issue to research on social support is the over-reliance upon stressful life events measures as indicative of stress levels. Dohrenwend and Dohrenwend (1974) discuss many relevant concerns with the stressful life events literature. More studies of naturalistic stressors (e.g., crowding) could be useful in investigating the effects social support has on the stress response.

There are also possible confounds within the notion

of social support. Heller (1979), for example, has discussed the social competency confound. It is possible that those who have the highest levels of support are the most capable of eliciting support from others, as well as being better able to cope with stress in general. Adequate controls and prospective studies could address this confound directly.

Also, mixed findings may contribute information rather than add confusion. In a study by Cohen and Hoberman (1983), measures of tangible, emotional, self-esteem and belonging support were used. Through the use of regression analyses, the authors were able to demonstrate the usefulness of a combination of four subscales of the support measure in predicting depression and physical symptoms. Self-esteem and belonging support buffered physical symptoms, while self-esteem and appraisal support buffered depression. Comparison of the use of this scale with the Inventory of Socially Supportive Behaviors (ISSB) (Barrera, Sandler and Ramsay, 1981) on the same group showed that the ISSB could not demonstrate the buffering effects. The ISSB is a global support measure and may not have been sensitive enough to show the buffering effects.

Another study (Fleming et al., 1982) of the mediating influences of social support at Three Mile Island showed a perceived support measure (emotional support) was capable of demonstrating buffering effects for self-reported symptoms, depression, and behavioral performance on a

concentration task. Main effects of stress and social support were demonstrated for urinary norepinephrine levels and for self-reported somatic distress, suggesting the "assets-benefits" hypothesis might better explain this pattern of results. These findings have not yet been replicated, but if they are replicated, more specific hypothesizing may become the rule rather than the exception in the literature on social support and stress.

In summary, although research generally indicates that a relationship between social support and stress exists, specifics of the relationship have just begun to be uncovered. An over-reliance upon life events measures as indicators of stress has tended to keep findings very general (e.g., social support buffers one against the effects of increased life events). Better techniques for measuring the stress response including the use of multi-modal assessments, are available and affordable and may allow greater freedom in the types of stressful situations studied with respect to social support. Reactions to disasters (Fleming, et al., 1982), job stress (La Rocco, House and French, 1980) and unemployment (Gore, 1978) are issues currently being investigated for the potential role of social support in mediating stress in these situations. Also, studies of reactions to crowding (Baum and Valins, 1979; Paulus, McCain and Cox, 1978) have provided some information concerning how mediating variables (e.g., perceptions of control) may be related to stress produced in these situations.

Cassel (1974a; 1974b) argues for the importance of psychosocial factors in disease etiology, specifically focusing on conditions within the urban environment (e.g., crowding) which may be related to health. An important area for study involves the possible role of social supports in buffering the stress of life in overcrowded urban communities, and links can be made between the design of the physical environment and social support.

Environmental determinants of social experience

The basic premise of this section is that environmental variables affect the frequency and quality of social contacts and that this, in turn, influences social support. Ultimately this would suggest a search for variables that increase positively regarded contact (thereby facilitating social involvement and support). Shunned would be those characteristics of environments that make social experience more aversive.

The simplest way to demonstrate relationships between social support and the physical environment would be to test the notion directly. This has not been done, and reliable measurement of such a relationship would pose a number of methodological problems. Social variables are likely to covary with a number environmental and demographic variables, and the simple demonstration of a correlational relationship between settings and support would not advance our understanding greatly. An alternate way of showing that social support is related to environmental variables would be

to demonstrate relationships between the environment and processes that affect social support. This section considers evidence of relationships between environmental and social variables. Because there are relevant data on architectural influences on social behavior, the discussion will concentrate primarily on architectural design of interior and exterior space. Although research on social support has not typically examined determinants of group membership and friendship networks, there has been interest in other areas that is pertinent. Social psychologists, sociologists, and others interested in the influence of the physical environment on behavior have examined how people use space in their social encounters and how the arrangement of space affects social experience and the use of this space.

The first question that must be addressed reflects a definitional dilemma. In order to demonstrate relationships involving social processes that are associated with social support, these processes must be specified. However, definitions of social support have varied widely, and there is no obvious set of criteria upon which to base such a decision. Central to the concept of social support, however, is the notion of groups of people. Cobb (1976), for example, referred to feelings of belonging to a group ---feelings that one is cared about by other people --- in defining social support. Similarly, some of the mechanisms used to explain the effects of social support are based on phenomena observed in groups. Appraisal support (Cohen &

Wills, 1983), for example, is partly based on research showing that one of the primary functions of group membership is to provide opinion validation and a reference for construction of one's social reality (e.g., Schachter, 1959).

If one accepts the assertion that groups are basic to social support, then one should be able to specify variables that affect social support by addressing group formation as a mediator. Variables and processes that foster group development should be associated with enhanced social support. The converse, that factors that inhibit group formation inhibit support, should also be true.

Research in naturalistic settings has suggested that group formation is enhanced by at least three variables. First, the opportunity for passive social contact appears to be important. In many instances, people get to know one another gradually, often through a succession of casual interactions that grow longer and more involved over time. This process of familiarization requires frequent opportunities for such contact. If one lives in a setting where neighbors are never seen, these incidental interactions will never occur.

Second, proximity appears to be influential in group development. Passive contacts will be more frequent among people living close to one another, and the face-to-face interaction that characterizes groups will also be facilitated by closeness. However, research has also

suggested that proximity can be modified by architectural features such as how space is arranged. A related issue is the requirement that groups have a "place" to meet. In naturalistic settings, group meetings are informal and more or less continuous. Therefore, appropriate space for a group to use as its own appears to be an important factor in group development. A neighborhood that provides spaces between homes that can be used by neighbors should be associated with more advanced group development than a neighborhood that does not furnish space that can be used by groups of residents.

Space can be central to social activity and the basic functioning of groups. The distances between people, the ease of reaching them, and the use of shared spaces (i.e., areas governed by a group rather than by an individual) are important to groups. In fact, the opportunity for regular face-to-face contact is part of what makes a group "a group," and if space does not permit this regular contact, groups cannot form or survive. People use space in ways that satisfy needs for contact, privacy, and intimacy. When they are unable to do so, normal social activity may be truncated and group formation can be slowed or prevented.

The arrangement of space and the degree to which it facilitates passive contact appear to affect group development and may therefore affect social support as well. A number of factors that appear to contribute to group formation and social support, including the opportunity to

meet people under benign conditions, see friends and other group members regularly, and use shared spaces for group-based activities, are affected by the design or layout of the environment in which people live or work. It is reasonable to argue that environmental factors that inhibit certain kinds of social activity can affect support. Friends with whom one has little contact because of distance or inconvenience may be less likely to contribute in a major way to social support. The potency of local support networks, however, has not been demonstrated.

The notion that the arrangement of space can influence social support is based on research showing links between environmental factors and social behavior. Studies have indicated that architectural arrangement of space can affect the development of small groups, the use of semi-private or group controlled areas, and the development of friendship networks (Baum & Valins, 1977; Festinger, Schachter, & Back, 1950; Newman, 1972; Yancey, 1972). Since these aspects of social experience should be related to support, this research should be useful in understanding relationships between the physical environment and social support.

Architecture and social behavior

Several studies have addressed architectural variables related to social contact, friendship formation, and group development. Some design features, such as shared access to residences or common areas, have been associated

with high levels of comfortable social contacts and friendship formation. Other features, such as the failure to provide space for groups to use, have been associated with frequent but unwanted social contact and low levels of friendship. Consistent with earlier discussion, these design features appear to affect group development by influencing the frequency and quality of passive social contact, the proximity of potential group members, and the availability of usable group space.

The first systematic investigation of environmental influences on social behavior was a study of student housing by Festinger, Schachter, and Back (1950). Before this, research had not typically considered the importance of ecological determinants of friendship and group formation. What little had been done was focused on the effects of residential propinquity on marriage selection (Abrams, 1943; Kennedy, 1943). Implicit in these and other studies was the notion that ecological variables (such as distance) could play an important role in determining who we choose as friends, what groups we join, and who we choose as a mate. More subtle environmental influences were not tapped, and it remained for Festinger and colleagues to recognize that environmental determinants could play a dramatic role in social experience, even when the existence of these determinants was barely noticeable. They suggested, among other things, that small differences in the placement of an entrance to a dwelling might have dramatic effects on who becomes friends with whom. In fact, they stated that

"...when our data had been assembled, the most striking item was the dependence of friendship formation on the mere physical arrangement of the houses." (p. 10).

Festinger et al. examined environmental variables that affected passive social contact. Their analyses revealed that the ease of interacting with neighbors, influenced by such variables as the placement of access paths or stairways, was a strong determinant of friendship formation. Social networks appeared to be determined by variables that affected passive contacts.

Friendship formation and passive social contact.

Festinger et al. studied these variables in housing facilities for married university students. One, called Westgate, consisted of single-story dwellings (2 1/2 - 4 rooms) laid out in U-shaped courts. Each court grouped 9-13 units around a central access area. The other housing project, Westgate West, consisted of 17 two-story buildings each of which contained ten apartment units. The housing projects were adjacent to one another, and were filled on a first-come, first-serve basis. The resident populations were homogeneous, and the residents of the two projects were comparable to one another.

In interviews with persons living in Westgate, Festinger et al. (1950) found that approximately 75% of developing friendships were among Westgate neighbors, allowing them the unique opportunity to study the formation of informal groups within a relatively closed system. They

reasoned that in communities such as Westgate and Westgate West, friendships were likely to develop out of a series of brief and passive contacts between residents. Therefore, two ecological factors that might prove important in the development of friendships were physical proximity and functional proximity.

Physical proximity refers to measured distance. People who live nearer to one another are more likely to meet each other and at least experience passive contact. Functional distance is dependent on the features of the design of the building or series of buildings that influence the likelihood of coming into contact with one's neighbors. Thus, the placement of stairwells may influence whose door you pass and whose door you do not pass. Figure 2 depicts the design of the buildings in the Westgate West complex.

 Insert Figure 2 about here

Physical distance should be influential in determining friendship networks. Consider the design in Figure 2. Assuming equal distance between doors, people living in apartment 7 should be much more likely to pass or meet neighbors in apartment 6 or apartment 8 than they would be to encounter neighbors in apartment 10. Since apartment 6 and apartment 8 are so much closer, chance contact with these people is much more likely. And, if chance contact eventually leads to friendship, then persons in apartment 7 should be more likely to designate closer neighbors as

friends. Festinger et al. (1950) found precisely this - when they asked residents to list the people that they spent time with, those living in adjacent apartments were four times as likely to be listed as were neighbors living four units away.

Although physical distance was important, functional distance also emerged as a major determinant of friendship formation. Again considering Figure 2, it can be seen that apartments 1 and 5 are located at the foot of stairways leading to the second floor. The presence and position of these stairs should increase incidental contact between those who must use the stairs and those who live near them. Residents of these apartments reported a greater number of passive contacts with neighbors using the stairs near their dwelling. Thus, residents of unit 8, though physically closer to unit 3 than to unit 1, would be more likely to encounter residents of unit 1 because the functional distance between them was reduced by placement of access routes.

This same pattern was found in the courts. As can be seen in Figure 3, access to housing was determined by a pattern of paths, and most units were reached by two or three shared routes. Units "a" and "m," however, were angled away from the court and either had a separate path or did not share very much of the central paths. This increased their functional distance from the other units,

Insert Figure 3 about here

and Festinger et al. (1950) found that residents of these units were less likely to encounter neighbors from other units and were less frequently identified by neighbors as being social acquaintances. Passive contact and friendship formation were influenced by access-authored functional distances.

Use of space by groups. Subsequent research has considered similar instances of the effects of the arrangement of space on the ways in which it is used and on the nature of social experience of people using it. Some structures or designs appear to promote contact between individuals, either by increasing passive contact or by making the context of these contacts more positive. Others seem to inhibit contact by making contact less frequent or more aversive. Thus far, however, design variables that affect passive contact and functional proximity have been considered. The presence of appropriate space for passive contact may be as important as whether the contact occurs at all. Architectural design of space can affect group development in other ways as well. Yancey (1972) describes an instance of atomization of social networks and inhibition of group development as a function of design in a low-cost housing project. The project, Pruitt-Igoe, consisted of a number of high-rise buildings. Because of the high-rise design, residents did not live close enough to exterior

spaces that could be used for social contact. In addition, the design of space within the apartment buildings did not provide any areas outside the private apartment that neighbors could share other than the corridors that connected the individual apartment units. As a result, Yancey argued, social contacts were infrequent, proximal space that could serve a group function remained unused, and local groups did not form.

Yancey (1972) made this clearer by distinguishing between life in the Pruitt-Igoe project and in an adjacent slum area. He argued that in slums, the cluttered streets and alleyways provide places for individuals to gather and conduct informal social contacts, supporting both the development of a social network and providing residents with informal social control over these areas in their neighborhood. Spaces that are conducive to group use and control were termed semi-private. In the normal slum, semi-private space was readily available. However, the "no waste" design of Pruitt-Igoe had also reduced the availability of semi-private space in these buildings. Passive contact was infrequent, social networks were atomized, and residents retreated into their apartments. Yancey (1972) provided an interesting illustration of these effects in his description of the experiences of the research team studying the two areas. While interviewing people in the slum neighborhoods, they often encountered people on the street who questioned them as to where they were going. After an introduction, residents often gave

interviewers instructions as to where a family could be found, when they might return home, or how to get through an alley to their apartment. Later, when the interviewers returned and approached the intended participant, they often got a response such as, "Oh yes, you were here earlier." Neighbors had given them the message that someone had been there to see them. During the three years of intensive research in Pruitt-Igoe, this never occurred. Because groups did not form and come to exert control over space, residents and nonresidents were not treated differently in Pruitt-Igoe.

One explanation of this difference in surveillance between Pruitt-Igoe and the nearby slum has to do with the kind of space available in each. Pruitt-Igoe provided private apartment space, which ended at the apartment door, and public access space. Residents could congregate in someone's apartment or in narrow hallways. In contrast, most of the buildings in the slum had stoops that extended private residences and public urban space. Residents could thus congregate in public space around semi-private space or in the semi-private space itself.

One further point of contrast is relevant here. Yancey reported that typical slum-dwellers were generally dissatisfied with their internal dwellings (many with very poor plumbing and heating) but generally satisfied with their surrounding neighborhood. With the Pruitt-Igoe residents, just the opposite was true. Residents were generally

dissatisfied with the surrounding neighborhood, often complaining of fears of being robbed, or raped, but were generally satisfied with their private dwellings.

Semi-private and defensible space. Yancey's findings suggest that semi-private space is necessary for the development of social networks and groups as well as residential satisfaction. The ill fate of the Pruitt-Igoe project stands as a stark reminder of the consequences of designs that do not meet behavioral as well as biological needs. The arrangement of space reduced passive contact, resulting in inhibited group formation, failure to exert group-based control over nearby spaces, and a number of social problems.

Newman (1972), in research on crime rates in various buildings and parts of buildings, discussed shared group-controlled space in terms of its defensibility. Defensible space is similar to semi-private space; it is shared by a small group of neighbors who use it regularly and control it (i.e., regulate who may use it, how it may be used, etc.). The key to this is the idea of a space where residents can see all the interactions that occur, and can exert some control over these interactions. Areas where surveillance and control were possible were found to have lower crime rates than were areas not under the informal control of residents.

A good illustration of defensible space is provided by an occurrence at the Pruitt-Igoe housing project. One

building was scheduled to have maintenance done and also to have some recreational equipment refurbished for children living in the building. In order to protect people from injury and equipment from theft, a fence was installed around the entire building. Keys to the gates were given only to residents and to some construction workers. The construction lasted about six months, during which time residents of the building began to sweep their hallways and pick up the litter surrounding the apartments. When the construction ended, several residents petitioned to have the fence remain - residents had found that crime rates and vandalism had been dramatically reduced during the six months that the fence had been there. Apparently, the fence increased the appropriateness of space around the building to serve as defensible space. Two years following the construction, the fence still remained and the crime rate for that building was 80% below the Pruitt-Igoe norm. Also, the vacancy rate of this building was running from 2 to 5%, while the rate for the rest of Pruitt-Igoe was approximately 70% (Newman, 1972).

Control of social contact. The importance of control over passive contacts is suggested by these studies, by determining when, where, and with whom one may interact. Passive contact is crucial to friendship and group formation, but most studies of this relationship have focused on settings that are more likely to provide inadequate or infrequent contact than excessive contact among neighbors. Baum and Valins (1977) studied two architecturally different

dormitory designs that were most notably distinct in the degree to which excessive social contact led to the same kinds of responses associated with the lack of encounters in other settings.

The principal difference between the dormitory types was architectural - the ways in which residential space was arranged. Corridor-design buildings housed students in groups of about 34 per floor. Each floor consisted of a long hallway with bedroom units off to either side along the hallway. Each of the bedrooms was shared by two residents. A large bathroom area and a lounge area were also provided along the hallway. These were shared by all 34 residents of the floor, and, since access was provided by the hallway, it was also used by all floor residents.

The second design, a suite design, housed equal numbers of residents on a floor, but broke the shared spaces on the floor into smaller units. Several suites were arranged along a central hallway, again shared by all floor residents. However, lounge and bathroom areas were provided within each suite, which consisted of two or three double-occupancy bedrooms grouped around a central lounge area and small bathroom used by suite residents.

These resulted in a number of different conditions. First, the group size or social density of the corridor-design buildings was high - 34 people shared all living space outside the bedroom. In the suite-style housing, most living space was shared by 4 or 6 residents. This appeared

to be related to both frequency and location of passive contact. Corridor dormitory residents reported frequent passive contact, usually in the hallways, and were more likely to feel that contact was excessive than were suite residents (who experienced most contact in the suite lounge). Corridor residents complained of unwanted social encounters, again usually in the hallway, and reported less control over when, where, or with whom an interaction might occur. The architecturally-derived social density in the corridor dormitories was apparently responsible for promoting excessive, unwanted, and uncontrollable interaction among neighbors.

The design of interior dormitory space also influenced group formation. Because of the excessive contact in the dormitory, corridor building residents exhibited withdrawal and attempted to avoid contact with neighbors. This strategy persisted despite the fact that encounters could not be eliminated. In addition, the design of the corridor dormitories forced passive social contact into the hallway, an area not well-suited to conversion to semiprivate space. Group formation in these dormitories was inhibited and control over hallway space never achieved. Unwanted interactions, then, occurred in uncontrolled areas.

Withdrawal from interaction is reminiscent of the conditions generated in Pruitt-Igoe. In fact, some of the processes involved are probably quite similar. Residents of the Pruitt-Igoe housing project faced a situation in which interactions outside of their apartments were largely

uncontrollable. Group space was not available and groups did not form. Fear of assault, robbery, and rape were prominent in these residents. The magnitude of the consequences of unfortunate designs at Pruitt-Igoe are clearly on a different order than those observed by Baum and Valins (1977), but in many ways, the same problems were responsible for resident distress.

The influence of the arrangement of space on social experience is potent. Social interaction or passive contact may lead to familiarity and eventually to group formation, depending upon whether social experience is positive or negative. If negative, (i.e., excessive contacts, uncontrollable contacts), social interaction may be viewed as aversive and may not be wanted, but when positive, interaction should facilitate group function. Several studies have revealed consistent, and sometimes major consequences of architectural design on the evolution of social networks. This is clearly related to social support if residents have less contact with neighbors or actively withdraw or avoid contact with them, they will be less likely to derive any social support from them. This topic will be discussed further in the next section.

The findings that have been reviewed suggest that the quality of social experience is affected by environmental variables such as architectural design. The arrangement of both exterior and interior space can affect social experience. Further, the social conditions associated with layout of space

(e.g., access routes, group size) can affect the social value of people, friendships, and so on. The pertinent and unanswered question, however, remains. The extent to which these kinds of effects are influential in the development of social support is still a matter of speculation.

Social support in the environment

The findings discussed in the preceding section provide some basis for speculation about environmental influences on the extent or effectiveness of social support. Clearly, social interactions occur in an environmental context, and this context affects several dynamics that common sense tells us are related to social support. Friendship and group formation and the use of shared space all seem central to the milieu out of which support is derived.

Distance is a factor in social support. If we are alone in a place far from our friends and family, our level of support should be low. Technological compensation for distance has moderated this somewhat. Modern telecommunications and transportation often put distant relatives and friends only seconds or hours away. These devices have changed the nature of family and social relations, and have made interaction with neighbors or co-workers less central than they once were. However, these interactions are still important, and environmental variables that affect the arrangement of local space should primarily affect social support derived from local sources.

The importance of local social support

As has been noted earlier, there are a number of sources of social support beyond the neighborhood or building. The implications of the research that has been discussed are limited to local-based social support, and their significance will depend on the relative importance of having social support from people in one's immediate environment. In all likelihood, the importance of local support will usually be a joint function of the situation and people involved. Those who live near an extended family may be less dependent on local support from neighbors or co-workers, while transient or highly mobile people may be more dependent on these sources of support. More research on relative benefits of different sources of support is needed, since research suggests that different sources are more or less important to different people at different times (Holahan & Moos, 1981). As a general rule, however, it is reasonable to assume that social ties with neighbors or co-workers are important for many people.

Another way to consider the importance of local sources of support is to consider the different functions of social support and how they may be affected by the extent of local, as opposed to more distant, support. For example, instrumental support - that aspect of social support having to do with the availability of actual, physical assistance (such as giving one a ride to the airport or watching one's children) - should be greatly affected by local sources.

Distant friends are less often able to lend instrumental support than are nearby friends. Appraisal support, or the help we get from friends in interpreting events and making decisions, may not be as dependent on local sources. Distant friends can provide advice and opinions, though local friends may have more opportunity to do so.

A good example of a situation in which local support networks may be of particular importance is provided by recent research on mass psychogenic illness (MPI) (e.g., Colligan, Pennebaker, & Murphy, 1982). MPI refers to unexplained, spontaneous outbreaks of illness or illness symptoms, usually in a work setting, that follow a pattern beginning with the presence of an initial index case of the illness or symptoms. Outbreaks usually occur in settings that are characterized by the presence of physical stressors such as noise, boredom, pressures toward increased production, strained labor-management relationships, and a lack of interaction among workers (Singer, Baum, Baum, & Thew, 1982). Of interest here is that the lack of contact among workers would suggest that local social networks are curtailed and the opportunity for normal social comparison is not available. In the absence of this appraisal support (that would normally be supplied by a local network) symptoms experienced because of stress or pressure may be attributed to illness if the opportunity for comparison with another is impossible. On the contrary, if more people were present and accessible, this would tend to increase one's accurate assessment of symptoms as opposed to such inaccurate assessments seen in MPI. In the case of MPI,

this is furnished when a worker attributes symptoms to a new stimulus or irritant (such as a strange odor) and develops an index case of illness. Singer et al. (1982) argue that the lack of opportunities to discuss this new stimulus in settings characterized by MPI outbreaks is an important determinant of the outbreaks.

Architecture and social support.

Architectural variables are among the many that appear to affect social relationships and support. The impact that these variables have on passive contact and social networks as well as the importance of locally-based social support highlight their potential significance. Yet, most research has given only lip service to physical features of the environment in studies of social support.

One finding by Festinger, Schachter, and Back (1950) of particular interest was that those people who reported the greatest number of friendships within the housing development also reported the greatest number of friendships outside of their complexes. It seems as though the greater numbers of informal social contacts for residents in the project may have also facilitated friendship formation outside of the housing area. In this case, the architectural design of the housing may have indirectly influenced social outcomes beyond the housing environment. Alternatively, there may have been some underlying personality variable which influenced the ability to make friendships, which could account for the greater number of friends for these individuals both inside

and out of the housing development.

Determinants of support. In a recent review of the literature on social support and health, Broadhead, Kaplan, James, Wagner, Schoenbach, Grimson, Heyden, Tibblin, and Getilbach (1983) note that, "much of social support may be environmentally-determined" (p. 530). However, the environment to which they refer is often the social rather than the physical. The influences they suggest include those of social class, community, and culture. The presence of opportunities for comfortable social interaction and friendship formation should also reflect determinants of support.

Personal characteristics affect social support as well. Age, gender, race, and marital status all appear to be important in determining support levels (Broadhead et al., 1983). Research has indicated an average support network size of nine or ten people (Ingersoll & Depner, 1980), and has suggested that the composition of these networks is typically weighted toward friends and co-workers (McFarlane et al., 1981). Women tend to maintain slightly larger networks than do men but do not appear to garner more overall support (McFarlane et al., 1981; Stephens et al., 1978). Being married is associated with higher levels of support, and being older tends to reduce support levels somewhat (Ingersoll & Depner, 1980; Stephens et al., 1978).

Beyond these determinants of support, a number of social conditions are important. For example, the size of one's family helps to shape support. The more children one

has, the greater support one is likely to have, and more people living in one's household is also associated with greater social support (Broadhead et al., 1983). Similarly, the availability of people with whom comfortable interactions have been worked out, places where casual contact can occur, and a community where the sheer load of interactions do not overwhelm residents can determine level of social support. The bottom line is an untested one - that friendship networks and the development of small groups are central to social support. It is probably untested because it is so obvious. However, the links between environmental variables and support appear necessarily based in these conditions.

Sources of environmental stress. One proposition, then, rests on the hypothesized links between social conditions (e.g., friendship patterns, passive contact, semi-private space) and social support. It makes sense to argue that the more friends one has, the more controllable one's social experience is, or the more suitable and environment is for passive contact and group interaction, the more support would be available. Despite the intuitive appeal this has, no data are available reflecting on the role of environmental variables in determining level of social support, and there is a similar lack of data about how environments contribute to stress directly by posing threats and indirectly by suppressing social support.

Preliminary results from studies of urban stress provide some information. The presence of small local

markets, convenience stores, and so on at the ends of residential streets was associated with higher social density, more frequent unwanted social contact, less group use of shared space, and inhibited group formation on the streets (Baum, Aiello, & Davis, 1979). This was apparently caused by the increased pedestrian traffic (relative to areas without stores) and by the fact that the people walking to and from the stores were often strangers to residents. The space that neighbors might normally use for interaction was now subject to use by strangers. Residents complained of lack of control over social experience and withdrew from neighborhood interactions. This was mediated by social support levels such that those who reported higher levels of social support exhibited fewer symptoms of stress than did those reporting lower levels of support (Baum, Davis, & Aiello, 1978). There were no effects of social support in low stress comparison neighborhood areas. There was, however, a trend suggesting that residents of streets without stores reported more social support than did residents of streets with stores.

This is an interesting finding because it suggests that environments may cause stress indirectly, by suppressing social support, as well as by way of direct threat. Research already reviewed has shown that architectural arrangement of interior and exterior space influences friendship networks, group development and control of space, and overall residential satisfaction. Since social support is at least partly derived from group membership and networks of friends, it is probable that support is also affected by these spatial

variables. In fact, research suggests that the same environmental variables that inhibit friendships and group development are also associated with stress (Baum, Singer, & Baum, 1981). Changes in social support over time have been observed and suggest that control and perceived health both fluctuate with social support changes over time. Most interestingly, social support ratings appear to be lower in the winter than at any other time, and decreases in support may be due to inhibition of neighborhood social interaction by the colder weather. Curtailment of interaction, which may reduce perceived support, may also cause increases in stress symptoms and loss of personal control.

A study by Miller and Ingham (1976) provides some evidence of this phenomenon. They found that people reporting having fewer acquaintances reported more troubling symptoms than did people reporting some acquaintances. In addition, people reporting having many acquaintances showed higher symptom profiles than did those with some acquaintances. Social dynamics may be a source of stress as well as a source of support, and too much social contact (or inappropriate conditions for social contact) may produce environmental demands that cannot be met.

Also, Cassel (1977) asserts that characteristics inherent in the social environment have been overlooked for their importance in the susceptibility to disease. He reviews a large group of studies showing that the people most

susceptible to a broad group of diseases are those persons whose social networks are truncated (Holmes, 1956; Christenson & Hinkle, 1961; Durham, 1961; Mishler & Scotch, 1963; Tillman & Hobbs, 1949). Cassel argued that research should focus upon interventions which will increase the positive aspects of the physical environment and decrease the negative. The construction of a fence around one of the Pruitt-Igoe buildings provides a glimpse of the effects of such "interventions." The fence provided control over the space surrounding the building (converting it from public space to semi-private, defensible space) and positive social interaction was facilitated (e.g., neighbors began sweeping hallways and interacting) while negative social occurrences (e.g., vandalism and vacancy rates) were decreased.

Design implications. Given that differences in architecture may affect the development and maintenance of social support, it may be inferred that whatever benefits that one may derive from having support will be accentuated by design facilitating group formation and use of space. One's health and well-being are affected by the environment within which one lives. Although most of the data concerning architectural influences on behavior already presented focus on crime rates and observations of social behavior, research has shown emotional changes, behavioral performance deficits, withdrawal, and greater use of health facilities for residents of environments where there was a minimum of semi-private or controllable living space (e.g., Baum & Paulus, in press). So, if architecture has an impact on not only "who"

we choose as a friend but also upon our mood, social behavior and even our health in general, what must be our rallying cry?

Surely, if one would hope to use any of this information to provide for positive change, it is not necessary to call for widespread renovation of the architecture that we presently occupy. This is especially true in our metropolitan areas, where "wasted space" has often been done away with. Even if the benefits were found to outweigh the many costs, it does not seem necessary to mandate large-scale demolition of "bad" architecture in favor of construction of better living spaces. This is suggested by the discussion of one of the buildings of the Pruitt-Igoe housing project where, the installation of a construction fence had a dramatic impact on the residents using that space. Also, Baum and Davis (1980) have shown that bisecting long-corridor style dormitories with the addition of an interior door and lounge halfway down one of the long corridor hallways was sufficient to reverse the effects previously associated with the unmodified environment. Essentially, this interior design modification created two "better," short-corridor dorms from one long-corridor design.

All 43 11-story buildings of the Pruitt-Igoe housing project had been demolished by 1972. Approximately 2,800 apartments were destroyed because the costs of continued use of the housing project were greater than perceived benefits. There may have been an alternative to this destruction. Of

course architecture still in the planning stage should be designed with considerations given to the viability of its living space - it is much better to change blueprints than to create living space which is at best useless and at worst occupied by persons subjected to its "bad" influence on their lives. Trends toward eliminating "wasted space" that might be useful as semi-private space should consider the effects of even small concessions to social needs. Although a good goal may be to create positive, supportive environments in which people may live, many of our less desirable architectural achievements may be quite a way from being more supportive living space.

Hypotheses

The study hypotheses are listed below:

1. A greater number of supporters would be listed on the Psychosocial Network Inventory (see Appendix I) by persons in the neighborhood design supporting social interaction (courts: See Figure 4) than by persons in the neighborhood design inhibiting social interaction (straights: See Figure 5). An essential element of the court design would be the partitioning-off of space affording common areas to the residents and a minimum of easy access to this space from surrounding areas. The straights would provide exterior space to the dwellings which would be open to public use and contain a minimum of boundaries which would limit constant access to the area by intruders.
2. Behavioral mapping would show a greater number of social observations in the courts than in the straights.
3. Behavioral mapping would show a greater number of nonsocial observations in the straights than in the courts.
4. Residents of the courts would show greater overall ratings on Baum's neighborhood support scale (see Appendix C) than residents of the straights.
5. Residents reporting higher neighborhood support and perceived emotional support (subscale of Baum's social support measure used in Fleming et al., 1982) would report fewer psychological and physiological symptoms on the SCL-90R

than residents reporting lower levels of these types of social support.

6. Residents perceiving higher levels of neighborhood support and emotional support would report less depression (SCL-90R), anxiety (SCL-90R), and alienation (SCL-90R) than subjects receiving lower of levels of neighborhood and emotional support.

7. Residents perceiving higher levels of neighborhood and emotional support would perform better (i.e., demonstrate better concentration by finding a greater number of errors) on the proofreading task than residents perceiving lower levels of neighborhood and emotional support.

8. An interaction, demonstrating the buffering hypothesis, would occur such that residents with low levels of social support who report the highest levels of stressors would show the highest levels of symptom reporting (SCL-90R), depression (SCL-90R), anxiety (SCL-90R), psychoticism (SCL-90R), helplessness than the subjects in the other three conditions (i.e., low support-low stressors, high support-high stressors and high support-low stressors).

9. This same interaction effect would be found for the proofreading task such that subjects with low levels of support and who report the highest levels of stressors would do the worst, while the other three groups would be comparable.

Chapter Two - Methods

Overview and Design

This research attempted to delineate architectural design factors associated with group formation and social support. Using a cross-sectional design, residents of two architectural layouts within an urban neighborhood were sampled: one layout had architectural features which should be facilitative of social support and group formation, while the other layout should not have been conducive to group formation and social support. Social support derived from neighbors was compared for the two types of design. Within each of these architectural designs, levels of background stressors were measured.

Architectural Designs. A neighborhood housing project with two differing architectural designs was used in the present research. To live in this project, residents had to earn as a family less than \$19,450 per year. They were assigned to their particular apartments randomly (haphazard assignment). One architectural design, the court designs, had a layout which should facilitate group formation and hence social support (see Figure 4). An essential feature to this court design was the partitioning-off of space affording common areas to the residents and a minimum of easy access to this space from surrounding areas (or neighborhoods). A second architectural design identified in this neighborhood consisted of apartments lining a single-loaded street (see

Figure 5). This design provided a good comparison for the court design since space exterior to the single-loaded dwellings was open to public use and contained a minimum of boundaries of the type limiting constant access to the area by intruders. Although friendships can be expected to form among single-loaded street (straights) residents as well as among court residents, the lack of areas usable for group interaction in the single-loaded street design was expected to reduce the "defensibility" of the areas surrounding these apartments and to lead less social support for residents living in these apartment layouts.

Subjects. Seventy-two subjects were recruited from a neighborhood in the urban Milwaukee, Wisconsin area. Thirty-six subjects from each architectural design were selected using a quasi-random sampling procedure. Six subjects from every court were sampled (there were 6 courts in total, with 3 buildings per court). Thus, two subjects from each building in each court were selected randomly (i.e., since buildings within the neighborhood in question have 4 or 6 apartments) and two subjects from each of 18 buildings lining two single-loaded streets were selected as well. Subjects were asked for their perceptions of stress in their neighborhood and were assessed for their affective, behavioral and physiological responses to stress. Measures of social support, life events, demographics, and an assessment of their neighborhood were collected. Participants were adult men and women between the ages of 18 and 64. Informed consent for participation was obtained

from the subjects and they received \$15 for their participation in the study.

Residents of the courts and the straights were not found to differ on any major demographic variable listed (see Table 1). The sample was shown to be predominantly single ($X_{\text{courts}}=38.9$ percent, $X_{\text{straights}}=52.8$ percent). Two-thirds of the sample were women. The mean age for the residents of the courts was 31.6, while the mean age of the residents of the straights was 30.2. They had lived at their present addresses for equal amounts of time ($X_{\text{courts}}=3.52$ years, $X_{\text{straights}}=4.06$ years) and were predominantly high school graduates (approximately 60 percent of each group).

Procedure

Subjects' apartments were selected randomly within each building with a roll of a single die². When a refusal was made, the experimenter randomly approached one of the remaining doors within the same building (according to a list for that building derived from the rolling of the die) in order to replace the refusal with a respondent within the same building. In this manner, a random sampling of each of the courts within the neighborhood was obtained. Further, the same procedures were followed for the single-loaded dwellings except that the buildings were grouped into threes before sampling, and each grouping of three was treated in the same manner as one of the courts.

Testing sessions. When approaching a door, the experimenter greeted the potential subject and explained the nature of the study and what participation would entail (see scripts - Appendix A). When a subject agreed to participate, the experimenter went over the consent form with the subject and obtained his or her signature.

The first measure that each subject completed was the proofreading test. This measure consists of a five minute timed test passage in which proofreading errors have been intentionally embedded. When the proofreading test was finished, the experimenter briefly explained each set of instructions for the group of questionnaires to be completed by the subject and then the subject was allowed to work on the questionnaires. Finally, when the subject had finished filling out the questionnaires, the experimenter explained the procedures to follow in order to provide the 15-hour urine sample (see Appendix B). A time was set to pick up the urine sample the next day, and the subject was paid, thanked and told to expect to hear from us concerning the research findings in about one and one-half months. At this later time, the entire object of the study was made clear to the subject and all questions were fully answered concerning their participation.

Behavioral Mapping. Previous work has shown that behavioral maps may be of use in documenting social interactions within a specific environment (Ittelson, Rivlin, and Proshansky, 1970). Behavioral maps of the selected court designs and single-loaded designs determining

the location (e.g., a front yard) of a range of social and nonsocial behaviors. The designs were compared for their amounts of social and nonsocial behavior during a set time span. (Mapping took place seven times during each of three weeks and on each of three consecutive Saturdays in both neighborhoods). In this manner, each of the six courts and each of the six groupings of three buildings on the single-loaded streets were adequately observed for the occurrence of social and nonsocial interaction within them.

For fifteen minutes each afternoon, the behavioral mapping was conducted. A procedure similar to that used by Baum, Davis and Aiello (1978) was used to map the interactions within the architectural layouts. Trained³ observers (a pair of research assistants who did not serve as experimenters) conducted the mapping on weekdays in the late afternoon and early evening hours (4:30 p.m. to 6:30 p.m.) and on Saturdays between (1:00 p.m. and 5:00 p.m.). In this manner, time of each of the observations (for each of the twelve areas) and which observer was doing the mapping could be randomized. Observers spent 15 minutes at each site (e.g., a court, or grouping of three buildings on the single-loaded streets) recording the location, number of persons involved and the type of interaction (social or nonsocial --- see Appendix C). Since any single individual could be observed under more than one category, the number of behavioral observations is equal to or greater than the number of people observed. For the purpose of presentation, the behavioral

categories of the mapping sheet have been summarized into two specific types: social observations and nonsocial observations. Social observations included interactions such as talking with another, walking with another, playing together, waving or nodding, or observed movements from one doorway to another within the observed area. Nonsocial observations included walking, sitting, working or standing alone. If, during the 15 minute period of time, a person was recorded to have engaged in a social interaction of some kind, that person would not be included in the nonsocial observation category.

Dependent Measures

Measurement of Social Support. A scale developed by Baum (Fleming, et al., 1982) was used to assess levels of social support for the subjects. This scale (see Appendix H) measures perceived emotional support, importance of social support, history of support, support from family, support from friends, and neighborhood support. All questions were Likert-type, 7-point (0 to 6) scales. Two of these subscales (perceived support and neighborhood support) have been used in the past, and the focus for the present study was upon these two subscales. Subjects also completed a modified version of the Psychosocial Network Inventory (see Appendix I). This instrument asks subjects to list the number of people (by initials) that were most important in giving them support when they required it. Also, subjects were asked to list how far each of the listed people live from one another and from the respondent. In this manner,

it could be determined how great a role neighborhood support is playing in each subject's overall levels of social support.

Measurement of Stressors. One questionnaire assessed the incidence of events that might be associated with stress. The first of these measures was the neighborhood questionnaire (see Appendix L), asking about crowding, noise, fear of crime, pollution, problems with neighbors, and so on. These questions can be conceived of as neighborhood relevant stressors. The second was a daily hassles questionnaire (see Appendix K) which appears to be related to chronic stress (Kanner, Coyne, Schaeffer, & Lazarus, 1981). The measure of daily hassles yields two scores: one score for the number of hassles endorsed as experienced within the past month and a second score of the severity (3 point scale) of the hassles endorsed. The final stress assessment was a life change instrument (Sarason, Johnson, & Siegel, 1978) which measures both the frequency of life events and their impact (see Appendix J). The stressful life events scale yields three scores: total stressful life events experienced within the preceding year, within the period of time from six months to one year ago, and within the the past six months. For the purposes of this study, only the number of events listed within the above three categories was used, since the advantage of the likert-type ratings of impact of the event has been questioned (see Rahe, 1975).

These three measures were used as independent variables in order to assess stress inputs for the residents

of the two types of design layouts. Although no differences should be reflected in these measures across groups, they would allow for internal analyses which are designed to test the buffering hypothesis of social support on stress responding.

Measurement of Stress Responding. These variables were used as dependent measures for analyses involving the role of social support in buffering the stress response. Three modes of stress response measurement were highlighted in the present study. Affective responding was assessed using questions concerning subjects' responses (e.g., anxiety, depression, somatization) on the subscales of the Symptom Checklist 90R (SCL-90R) (Derogatis, 1977). Subscales for physical symptoms (e.g., somatic complaints) were recorded as self-reported measures of distress⁴. Several questions also addressed subjects' opinions of how stressful it was to live in their neighborhood (see Appendix G).

Behavioral performance was measured using the proofreading test from previous research (Glass & Singer, 1972; Fleming et al., 1982). The passage used was an excerpt from Jacob's The Death and Life of Great American Cities which had the same number of errors embedded within it as in past research. Subjects were asked to mark every error that they found as they proofread the passage. The subjects were given five minutes to proofread as much of the passage as possible. At the end of this interval, the subject's progress was marked by drawing a line under the last sentence read. The number of errors in the passage

proofread was converted to a percentage of the total number of embedded errors up to the point read by the subject. Thus, the proofreading test (see Appendix F) was as a dependent measure of subjects' ability to concentrate.

Urine samples were collected and assayed following the same procedures as Fleming, et al., (1982) (see Appendix O). Fifteen hour samples were collected from approximately six p.m. to nine a.m. All urine produced during this time was to be placed in the clinic white container provided for the subjects by the experimenter. Samples were collected the following day, measured for volume and mixed, and a smaller sample was poured off and frozen until assayed. These samples were preserved using a non-causatic salt (sodium metabisulfite) and radioenzymatic assay procedures (see Durett & Zeigler, 1980), using catechol-o-methyltransferase, were used to assess the levels of free epinephrine and norepinephrine in the urine. Since relatively constant fractions of epinephrine and norepinephrine are excreted in the urine (Frankenhauser, 1973), estimates of these substances provide a good measure of adrenal medullary activity, sympathetic arousal, and hence stress. The usefulness of this biochemical marker has been demonstrated in many studies (e.g., Cannon, 1936; Singer, Lundberg, & Frankenhauser, 1978).

Also, subjects provided reports of how many amine-producing foods they consumed during the time period covering the urine sample. Along with the volume measure,

these data were used in order to control for possible
sources of error⁵. Thus, catecholamine levels would reflect
sympathetic arousal and were used as a dependent measure
documenting the stress response.

Experimenters. Six male undergraduates who were
blind to the hypotheses of the present study, served as
experimenters. Behavioral mapping was conducted by two
other students, one male and one female, who were also blind
to the research hypotheses. In both cases, each
experimenter and mapper performed their assigned tasks in
both the court designs and in the single-loaded street
designs. The experimenters and mappers were told that
other students were completing the project in another
neighborhood. Thus, they were lead to believe that they
were running the study in one of two neighborhoods to
be compared. Also, since each experimenter and mapper
worked in both architectural layouts, the two layouts were
accepted by them as one group, or a single neighborhood. In
this way, a minimum of experimenter bias was expected and
the research assistants remained blind to the overall
intentions of the study.

Chapter Three- Results

Measures of Stressors

Three measures of stressors were used to determine differences in exposure to potential stressors in the two architectural layouts. A stressful life events scale (Sarason, Johnson, & Seigel, 1978), an inventory of exposure to daily hassles (see Kanner, Coyne, Schaefer, & Lazarus, 1981) and questions concerning subjects' appraisals of various potential stressors within their immediate environment (e.g., ratings of perceived levels of noise, pollution, etc.) were used to determine levels of stressors within the two neighborhood layouts.

No differences were found between the court layouts and the single-loaded street layouts for any of the measures of stressful life events (see Table 2). Also, no differences were found between the courts and the single-loaded street layouts on either of the measures of daily hassles as well (see Table 2). On the questionnaire concerning stressors within the neighborhood (see Appendix L), only noise from automobiles differentiated the two architectural layouts. Overall, there appears to be no difference in stressors between the courts and the single-loaded street layouts.

Use of Neighborhood Space

Two overall differences in the use of space in the courts and single-loaded street layouts were observed. More people were present during the behavioral mapping in the single-loaded street layouts than in the court layouts

($t=2.92$, $df=118$, $p<.01$; $X_{\text{straights}}=11.72$ versus $X_{\text{courts}}=8.43$). Figure 6 shows the mean number of persons observed in the courts and single-loaded streets by observation day. On only one day was the number of persons observed greater in the courts than in the single-loaded street layouts. Although there were a greater number of persons observed in the single-loaded street layouts, a greater proportion of the observed behaviors in the courts could be categorized as social observations ($X^2=11.4$, $df=1$, $p<.001$; $X_{\text{courts}}=62\%$ versus $X_{\text{straights}}=47\%$), while a greater percentage of nonsocial observations were observed in the single-loaded street layouts. Figure 7 shows the percentage of social observations (to total) for the courts and single-loaded streets for each of the ten behavioral mapping periods. From the graph, it appears that the percentage of social observation within the two areas is relatively constant over time and that the single-loaded street layouts do not seem to favor either social or nonsocial observations, while the court layouts appear to favor greater social observations than nonsocial observations.

Perceived Neighbor Support

Two measures of neighbor support were used in the present investigation. A subscale of Baum's social support scale (see Table 3 for reliability estimates) was used to determine the levels of perceived neighbor support for persons in both the courts and the single-loaded street layouts. Also, a modified version of the Psychosocial

Network Inventory (see Appendix I) allowed the determination of the distance from the subject for all persons listed on the instrument. In this manner, not only the valence of the relationship with the listed person was coded, but also whether the listed person lived within 2 or 3 buildings of the subject could be determined.

For the number of supporters listed as within 2 or 3 buildings of the subject, a chi-square analysis revealed a significant difference between the courts and single-loaded street layouts (see Table 4) such that a greater number of residents of the courts listed one or more supporters living near them than did residents of the single-loaded street layouts ($\chi^2 = 3.51, df=1, p=.06$).

Using a oneway analysis of variance, the Neighbor subscale of Baum's social support scale showed a significant difference between the two groups such that the courts reported significantly greater perceived neighbor support than did the single-loaded streets ($F=5.99, df=1,67, p<.02$; Courts=15.74, Straights=12.18). Although there were no differences found between the courts and single-loaded streets on how long they had lived at their present addresses, it is important to this analysis whether or not the respondents had lived at their present address long enough to establish supportive relationships with their neighbors. Since the interviews with the subjects were taking place very early in the spring, it was reasoned that only persons who had lived near their neighbors throughout the previous summer would have had enough opportunity to interact within their neighborhood

and establish supportive relationships. Only 3 subjects had lived at their present address for less than six months, but several more had indicated that they had moved in approximately one year prior. If time is required in order to establish a supportive relationship with one's neighbors, then comparison of the courts and single-loaded streets without these relatively newly arriving subjects should show an even greater difference in perceived neighbor support. A oneway analysis of variance revealed this to be so ($F=8.94$, $df=1,52$, $p=.004$; Courts=16.92, Straights=12.18).

Values on the perceived neighbor support subscale and the number of supporters listed (on the Psychosocial Network Inventory) within 2 or 3 buildings were positively correlated ($r=.48$, $n=66$, $p<.001$).

Further, residents of the courts were more satisfied with their neighborhood, were more likely to ask their neighbors to watch their house while they were on vacation, and liked their neighbors better (see Table 5). Marginally significant effects were also found indicating that residents of the courts felt that their neighborhood was more friendly, that they saw more people that they know in their neighborhood, were more likely to talk to their neighbors in their yards, enjoyed the company of their neighbors more and wanted to spend more time with their neighbors (see Table 5).

Perceived Emotional Support

If perceived neighbor support contributes significantly to one's overall level of social support, then

one would also expect that differences might exist between the courts and single-loaded streets for overall perceived emotional social support. The perceived emotional social support subscale of Baum's social support scale showed a marginally significant effect ($F=2.7$, $df=1,68$, $p=.10$) such that the residents of the single-loaded streets reported greater levels of support ($X_{courts}=25.06$, $X_{straights}=27.71$). However, two findings may explain this unexpected result. First, the only background variable which showed a significant difference between the courts and single-loaded streets was the "number of family members living in the area" ($F=3.17$, $df=1,67$, $p=.08$) such that the residents of the courts reported fewer family members living within the area (Milwaukee) ($X_{courts}=4.59$, $X_{straights}=6.37$). Also, the residents of the single-loaded streets listed a significantly greater number of family members ($F=4.63$, $df=1,68$, $p=.04$; $X_{straights}=5.43$, $X_{courts}=3.89$) and listed a greater number of persons as important but who live outside their neighborhood ($F=6.57$, $df=1,67$, $p=.01$; $X_{straights}=2.11$, $X_{courts}=0.59$). Previous research has shown a negative correlation ($r=-.30$) between distance from family members and level of perceived emotional social support (Fleming et al., 1982). Also, when the analysis on perceived social support was run for those who had lived at their present address for greater than one year, the difference decreased ($F=1.87$, $df=1,52$, $p=.18$).

Even though neighborhood layout was not shown to influence one's overall level of perceived emotional support, this variable should predict stress responses of the residents.

The Stress Response

No differences were found between the courts and the single-loaded street layouts on stress response measures. The residents of the single-loaded streets did report greater "feelings of helplessness" than the residents of the courts ($F=3.59$, $df=1,66$, $p=.06$; $X_{straights}=.72$, $X_{courts}=.31$).

Perceived emotional support has been shown to mediate stress responding (Fleming, et al., 1982). An internal analysis was performed to examine these findings in the present study. Similar to procedures used in Fleming et al., (1982), subjects were split into three groups: low social support, moderate social support, and high social support. These categories divide the sample into approximate thirds. One way analyses of variance were performed in order to determine differences between the three groups on the stress response measures. Similar to previous findings, significant differences were found between levels of perceived emotional support and stress responding. For self-reported symptoms differences were found all but three subscales of the SCL-90R. Depression ($F=3.20$, $df=2,66$, $p=.047$), anxiety ($F=6.27$, $df=2,66$, $p=.003$), hostility ($F=5.45$, $df=2,66$, $p=.006$), psychoticism ($F=2.60$, $df=2,66$, $p=.082$), paranoid ideation ($F=6.81$, $df=2,66$, $p=.002$), interpersonal sensitivity ($F=5.25$, $df=2,66$, $p=.008$), and the positive symptom total ($F=3.74$, $df=2,66$, $p=.029$) showed significant differences among levels of perceived emotional

support. The three subscales not showing significant differences, somatization ($F=1.76$, $df=2,66$, $p=.18$), obsession-compulsion ($F=2.30$, $df=2,66$, $p=.11$) and phobic anxiety ($F=2.16$, $df=2,66$, $p=.12$) did approach significance. The behavioral performance measure, proofreading, also approached significance ($F=2.24$, $df=2,62$, $p=.12$), while the endocrine measures, urinary epinephrine ($F=1.50$, $df=2,46$, $p=.24$) and urinary norepinephrine ($F=1.21$, $df=2,46$, $p=.31$) did not show significant differences among levels of perceived emotional support. See Table 6 for a list of means.

A series of stepwise regression analyses were run in order to determine the relative contribution(s) of several support variables in mediating the stress response: perceived emotional support, neighbor support, and the number of persons listed as positive (rating of 4 or 5) on the Psychosocial Network Inventory. Also entered were the number of daily hassles listed and architectural arrangement (courts=0, straights=1). The number of daily hassles listed was the best predictor of self-reported stress response variables. Results indicated that daily hassles were strongly associated with self-reported stress response variables (SCL-90R), with the number of daily hassles failing to account for significant portions of variance for phobic anxiety (SCL-90R), the proofreading task and the biochemical measures of arousal (see Table 7). Perceived emotional support was the only predictor of the behavioral and biochemical measures of stress responding.

Perceived emotional support appears to have accounted

for a modest amount of variance (approximately 5 to 10 percent) on all three modes of stress response. Significant portions of variance on the positive symptom total, hostility, interpersonal sensitivity, psychoticism, proofreading and urinary epinephrine levels were found for perceived emotional support.

A "counts" variable consisting of the total of positively-rated persons on the Psychosocial Network Inventory did not fare as well in predicting stress response. This variable only accounted for a significant portion of the variance on the anxiety subscale of the SCL-90R.

The neighbor support also faired poorly in predicting the stress responses of the subjects, yielding significant betas on only two subscales of the SCL-90R (anxiety and phobic anxiety). Both of which appear to be in the opposite direction that one might expect, showing a positive relationship between neighbor support and these self-report measures of anxiety/fear.

Testing the Buffering Hypothesis

Since there were no differences found between the courts and straights on the various measures of stress responding, an internal analysis was run on level of daily hassles (median split) and levels of perceived emotional support (sample split into approximate thirds following the procedure in Fleming et al., 1982). If the buffering hypothesis is active, one would expect to see main effects for level of daily hassles and level of perceived emotional

support, and also interaction effects. If the buffering hypothesis is not active, one would expect not to see the interaction effects between daily hassles and perceived emotional support on the stress response measures. Table 8 shows clearly that the buffering hypothesis was not supported for this analysis. The only significant interaction between hassles and support occurred on the proofreading measure ($F=3.61$, $df=2,57$, $p=.033$). It is clear that greater hassles is related to greater stress response. Level of daily hassles fails to show main effects only on the biochemical measures of stress responding. The picture is similar but less clear for the effects of perceived emotional support on the stress response measures. Levels of perceived emotional support also fail to show main effects for the biochemical measures of stress responding. There is also only a marginal main effect for perceived emotional support on the behavioral performance measure of stress responding (proofreading) and several of the self-reported symptoms fail to show main effects as well.

Predictors of Neighborhood Satisfaction

However, the neighbor support subscale predicts significant portions of variance on neighbor and neighborhood satisfaction variables (see Table 9). This subscale is the largest predictor on several questions concerning satisfaction with one's neighbors and one's neighborhood. In fact, the neighbor support scale is the first (stepwise) or only predictor for nine of the satisfaction variables: how satisfied respondents are with their neighborhood, how friendly respondents feel their

neighborhood is, the extent to which they feel they do things with their neighbors, how often they feel that they do things with their neighbors, whether they often include their neighbors in things they do, how much they feel they have in common with their neighbors, how much they enjoy the company of their neighbors, how much time they want to spend with their neighbors, and how much they like their neighbors. The neighbor support subscale is also a significant predictor of how often the respondents feel left out by their neighbors ($\beta = .34$). This appears to be in the opposite direction that one would expect, the number of persons listed as positive and within 2 or 3 buildings of the respondent is a larger, significant predictor ($\beta = .40$), indicating that, indeed, the persons listing a greater number of supporters living close to them also feel less left out by their neighbors.

Chapter Four - Discussion

The present study examined several hypotheses concerning the interplay between architectural layout and perceptions of social support. Primarily, it was designed to demonstrate that sociopetal designs, operationalized by the court layouts, would lead to perceptions of greater neighbor support than sociofugal designs, operationalized by single-loaded straight layouts. The expectation was that the layout of the buildings would affect how the residents use the surrounding space and that differences in the use of this space surrounding their apartments would in turn lead to differences in friendship formation and perceptions of support from neighbors.

Specifically, results from the behavioral mapping procedure indicate that there was more activity in the straights than the courts (more people were observed in those areas during mapping) and that the courts had a higher percentage of the observations which were coded in any of the categories which were designated as "social" behaviors (e.g., waving/nodding, movement from door-to-door within the area, talking). The "raw" number of social observations was the same in the two groups (courts=337, straights=336). Thus, it might be argued that it was not that the courts were facilitative of social interaction as much as the straights were not as facilitative of social interaction as the courts. On an intuitive level, it is appealing to argue that the logic

of the two designs (orientation of the apartment houses with respect to others in their immediate surroundings) suggests that the courts are facilitative of social interaction. The court arrangements place the doorways of the apartments more in contact with one another and reduce the functional distance from one unit to another. The U-shaped arrangement of the courts has also been described in previous research (Newman, 1972) as creating "defensible space." This type of space is controllable by the neighbors in it and tends to reduce the number of "intrusions" into the area by outsiders (e.g., people would be less likely to use the courts' lawn areas as a short cut to another destination). It is not possible to tell from the present research which of the two alternatives is operative. From this research, one can imply that mere arrangement of identical buildings is sufficient to change the way that people use the surrounding space.

Architectural layout was shown to affect perceptions of neighbor support. Persons living in the court layouts reported significantly higher levels of neighbor support than residents of the single-loaded straights. Neighbor support was also shown, in a series of regression analyses, to account for significant portions of variance on neighbor(hood) satisfaction ratings (see Table 8). These results clearly demonstrate that subtle differences in the environment can have significant influences upon how residents perceive their environment, how they interact with others within their surroundings and how those surroundings influence perceptions of the degree to which

those around us are supportive of us. Here, the mere positioning of identical apartment buildings changed the way neighbors and the neighborhood were perceived. This is to some degree a reiteration of the proposition made by Festinger et al., (1950), that the "functional" relationships within the environment may have profound effects upon behavior.

Not only did the court residents report significantly greater levels of neighbor support than residents of the straights, but they also listed a greater number of neighbors living within 2 or 3 buildings which they considered to be highly supportive or extremely supportive of them. Consistent with this, the residents of the courts liked their neighbors better and were more satisfied with their neighborhood.

Measures of stressful inputs indicated that there were no differences between the courts and the straights. This is important in ruling out stress input as being influential in the support results. Also, levels of daily hassles did not differ between the two groups and the mean level of daily hassles endorsed was similar to that found in previous investigation using the scale (see DeLongis et al., 1982). The only "input" difference between the two groups was that the residents of the straights were bothered more by noise from automobiles. This finding may be due to the fact that the doorways and windows of the straights are closer to the street than those in the courts and they may, therefore, be more susceptible to the sounds of the streets. Otherwise, the

two groups were identical stressors in their reporting of levels of stressors in their environment. The neighborhood was probably different on the architectural layout variable only.

This study was also designed to reinvestigate the relationship between stress responding and levels of perceived emotional support. Previous research (e.g., Fleming et al., 1982) indicated that perceived emotional support mediates the effects of stressors in producing stress responding in exposed individuals. In order to reexamine this, the perceived emotional support distribution (for the entire sample) was split roughly into thirds and the effects of levels of perceived emotional support on major stress response measures were explored. In this way, self-reported affective responses (SCL-90R), behavioral responses (proofreading) and endocrinological responses (urinary epinephrine and norepinephrine) could be observed for varying levels of perceived emotional support. Findings strikingly similar to those previously reported (Fleming et al., 1982). Perceived emotional support showed significant effects on self-reported stress responses on the SCL-90R, with persons reporting lower levels of support endorsing higher levels of psychological and behavioral symptoms of stress. A similar main effect approached significance for the behavioral proofreading measure (which is conceptualized as a measure of concentration). Neither of the endocrinological measures was affected significantly by the level of perceived emotional support. Fleming et

al., (1982) did find a significant main effect of support on norepinephrine levels, but this finding was not replicated in the present study.

Previous research (DeLongis et al., 1982) has shown that the experience of daily hassles is significantly related to higher stress response. Stepwise regression analyses, in which various indicators of social support (perceived emotional support, perceived neighbor support, the number of positively rated supporters listed by subjects), architectural arrangement (courts versus straights), and the number of daily hassles (for the past month) were loaded, indicated that level of daily hassles is a consistent and significant predictor of stress responding.

Although both the measure of perceived emotional support and the measure of daily hassles appear to predict stress responding in this sample, little evidence was found in support of the stress buffering hypothesis of social support. This hypothesis, illustrated graphically in Figure 1, predicts interaction effects between levels of social support and stress. Analyses of variance revealed significant main effects for level of daily hassles on the self-report and behavioral measures of stress responding but no effects for the biochemical indices of stress responding. For level of perceived emotional support, the main effect for the proofreading test was only marginally significant and fewer of the self-reported symptom measures showed main effects.

A significant interaction between level of daily hassles and level of perceived emotional support was found, indicating a buffering effect of social support on behavioral performance in this study. However, no other support for the stress buffering hypothesis was found on this set of analyses.

Before concluding that these results provide only equivocal support for the stress buffering hypothesis, one must consider the overall picture of stress responding within this group of subjects. Although this sample represents a different group of people (based upon demographics) taken at a different point in time than those of the stressed group in the Fleming et al., (1982) study, there is a striking similarity between the stress response measures of the present sample and of the stressed group of the Fleming et al., (1982) study. From this, one might conclude that a median split on the daily hassles measure may have been a weak test of the buffering hypothesis in that it was probably dividing a "stressed" group artificially into "low" and "high" subgroups. Although this type of analysis (median splits on measures of daily hassles or stressful life events) has been done in the past, it is generally assumed that one is sampling a complete range of stressed and nonstressed individuals. Also, where possible, researchers choose to compare "known" stressed groups with nonstressed controls (as in Fleming et al., 1982) in order to establish that high levels of social support buffer stress for recipients to the levels of nonstressed controls.

The design of the present study did not allow a direct test of the succession of hypotheses that the layout of the buildings in the neighborhood would affect how residents use the surrounding space and that differences in the use of this space would in turn lead to differences in friendship formation and perceptions of support from neighbors. Residents were interviewed concerning their present perceptions of support received from neighbors and were not followed from their move-in date. Also, the behavioral mapping procedure was designed to differentiate social from nonsocial use of neighborhood space surrounding the apartments. It could not, however, pinpoint exactly who were the individuals using the space. That is, persons observed using the space surrounding the apartments in the present study were not necessarily the respondents to the questionnaire measures. A better design for such a study might be similar to the setup acquired by Festinger et al., (1950), in that they were able to get respondents as they moved into their apartments. Use of space in such a longitudinal study would allow a clearer description of the development of social support through the social use of space surrounding the dwellings.

The findings of this study suggest some directions for future research. It has been clearly demonstrated that architectural arrangements can affect the way space is used. It has also been shown that residents of an architectural arrangement which affords controllable space for social

interactions will preferentially use that space socially. These same individuals will also respond more favorably about their neighbors and their neighborhood when asked. Thus, it seems that often overlooked aspects of an environment (e.g., which way a series of apartment buildings face) may have impact upon the lives of its residents, and that impact may affect the way they feel about one another and the way they behave when they are present in that environment. The link between such architectural variables and stress or stress responding has not been made in the present research. Future investigations may be best directed toward longitudinal designs in a variety of related settings in order to uncover some of the more subtle influences that the environment has on our feelings and behavior. It is possible that the impact of the physical arrangement of space may be of minor importance in a neighborhood setting, where each neighbor spends relatively little time using the space. However, other environments, where individuals are more likely to spend time using the space and where the importance of its use is much higher (e.g., offices, homes for the elderly, prisons), may impact much more powerfully not only on the behavior and feelings of the individuals using the space, but possibly on their reactions to stressors as well.

Footnotes

1. The acceptance rate for the present study was 76.4%, including 72 of 94 individuals approached for participation. Of these 72, 69.4% (50) consented to the 15-hour urine void. Also, an attempt was made to solicit as many males as females. Experimenters approaching a subject would ask if she thought that her spouse would be interested in participating in the research. This has been an effective method in previous research with a similar sampling procedure of increasing the number of males in the sample. Overall, 25 households were sampled in the courts and 26 households in the straights.
2. Since only two types of buildings (four apartment units and six apartment units) existed within the neighborhood, the exact apartments to be approached by experimenters were determined prior to sending the experimenters into the field. For example, in determining which apartments to approach within one of the six-apartment buildings, the doorways were numbered from left to right while facing the front of the building from one to six. Rolling a four would determine that the fourth apartment door from the left in that building would be approached. A second roll of the die (other than a four) would determine the other door to approach within that building. The same procedure was used for the four-apartment buildings (discarding rolls of five or six). If the experimenter received no answer from the assigned apartment, return trips were made until an answer was received.

3. Two mapping sessions were used to determine inter-mapper reliability for this procedure. A Pearson Product-moment correlation of .86 was obtained between mappers indicating that their mapping was consistent with one another.

4. The Symptom Checklist 90R was developed at John's Hopkins University as a measure of outpatient clinical psychopathology, but has been used extensively as a measure of stress response as well. Although its subscales (e.g., depression, psychoticism) were aimed at specific clinical outpatient groups, and may therefore reflect personality differences in its clinical respondents, this instrument has proven a sensitive indicator of nonclinical symptom reporting in response to stress.

5. The list of amine-producing foods was to used to control for their effects on the urinary catecholamine levels. There was very little variance on this measure, such that differences could not be distinguished.

6. Compared with the three-way split in Fleming et al., (1982), the present study's categories of "low" and "moderate" approximate the "low" category in Fleming et al., (1982) and the "high" category of the present study would encompass both the "moderate" and the "high" categories within the previous study. With this in mind, the figures from the oneway Anovas of this study virtually duplicate the previous findings.

Table 1
Demographic/Background Variables

Variable	F	p	Means	
			Courts	Straights
Where <u>S</u> grew up (Mke=0, other=1)	0.51	.48	0.21	0.29
Marital Status	0.23	.64	2.14	2.00
-Single			38.9	52.8
-Married			33.3	19.4
-sep./div./widowed			27.8	27.8
Gender (% Female)	0.06	.81	64.0	61.0
Age	0.02	.89	31.6	30.2
Current Family Size	1.75	.19	3.52	4.13
Years Living at Present Address	1.15	.29	3.67	4.06
Family Size When Growing Up	0.60	.44	6.49	5.94
Number of Siblings	0.01	.93	4.40	4.33
Number of Family Members in MKE	3.17	.08	4.59	6.37
Number of Miles to Closest Family Member	0.01	.93	6.28	6.52
Education Level (%)	0.12	.73	2.25	2.31
-Grammar			8.30	8.30
-High School			61.1	58.3
-Some College			27.8	27.8
-Graduate Work			2.80	5.60
-Others			0.00	0.00
Family's Education Level				
Spouse's	1.85	.18	2.25	1.90
Mother's	0.02	.90	2.09	2.06
Father's	0.38	.54	2.19	2.00
Income	0.41	.52	1.59	1.44
<\$10,000/year			61.1	63.9
\$10,000-\$15,000			22.2	16.7
\$15,000-\$20,000			5.6	2.8
\$20,000-\$30,000			0.0	5.6
>\$30,000			5.6	0.0

Table 2
Stressful Input Variables

<u>Variable</u>	<u>F</u>	<u>p</u>	<u>Means</u>	
			<u>Courts</u>	<u>Straights</u>
Stressful Life Events				
Total	0.01	.937	6.25	6.36
6-12 months	0.24	.629	2.16	2.52
0-6 months	0.05	.824	4.09	3.85
Daily Hassles				
Number	0.08	.780	33.06	35.17
Severity	0.28	.600	59.27	67.03
Neighborhood Questions				
Noisy Neighborhood	0.29	.580	4.08	4.29
Busy Neighborhood	2.23	.140	4.11	4.60
Noisy Automobiles	7.91	.006	3.08	4.29
Noisy Airplanes	0.67	.414	2.67	2.37
Noisy Neighbors	0.61	.437	3.53	3.82
Air Pollution	0.87	.353	3.17	3.56
Fear Crime	0.03	.861	4.74	4.82
Trash on lawn	1.52	.222	5.17	4.65

Table 3

Cronbach's Alpha Reliability on the Neighbor Support
Subscale of Baum's Social Support Scale

- A: "My neighbors make me feel cared about."
 B: "My neighbors make me feel important."
 C: "I can always count on my neighbors."
 D: "I don't have much support from my neighbors."

CORRELATION MATRIX

	A	B	C	D
A	1.0000			
B	.6141	1.0000		
C	.6585	.7389	1.0000	
D	.3895	.4486	.4389	1.0000

* Question D was reverse coded.

ITEM-TOTAL STATISTICS

	SCALE MEAN IF ITEM DELETED	SCALE VARIANCE IF ITEM DELETED	CORRECTED ITEM-TOTAL CORRELATION	SQUARED MULTIPLE CORRELATION	ALPHA IF ITEM DELETED
A	13.4493	24.2511	.6701	.4750	.7811
B	13.7246	23.3201	.7442	.5878	.7484
C	13.4638	20.5759	.7571	.6196	.7386
D	13.4493	27.6334	.4820	.2349	.8579

RELIABILITY COEFFICIENTS

ALPHA = .8306

STANDARDIZED ITEM ALPHA = .8291

Table 4

Chi-square Analysis on Architectural layout versus the number of supporters listed as living close to the respondent.

		Courts		Straights		
Number of Supporters Listed As Living Within 2 - 3 Buildings	0	I		I		46
		I		I		
		I	19	I	27	
		I		I		
		I		I		
	≥ 1	I		I		23
		I		I		
		I	15	I	8	
		I		I		
		I		I		
		34		35		

$$\chi^2 = 3.51, df=1, p=.06$$

Table 5

Neighbor/neighborhood satisfaction variables

<u>Variable</u>	<u>F</u>	<u>p</u>	<u>Means</u>	
			<u>Courts</u>	<u>Straights</u>
How satisfied are you with your neighborhood?	6.52	.01	4.00	2.94
How much do you like your neighbors?	3.90	.05	4.28	3.60
How comfortable do you feel asking your neighbors to watch your house while you are away on vacation?	5.90	.02	4.63	3.40
How much time would you want to spend with your neighbors?	2.65	.11	3.60	3.11
How friendly is your neighborhood?	2.44	.12	4.25	3.68
How often do you talk to your neighbors in your yard?	2.40	.13	5.03	4.40
How often do you see people you know outside your house?	2.38	.13	4.94	4.31
How much do you enjoy the company of your neighbors?	2.13	.15	3.97	3.34

Table 6

Oneway Analyses of Variance with Perceived Emotional
Support Split (Low, n=23; Moderate, n=24; High, n=25)

DV	F	p	$\bar{X}(L)$	$\bar{X}(M)$	$\bar{X}(H)$
Positive Symptom Total	3.74	.029	36.46	37.04	*23.54
Depression	3.20	.047	0.83	0.94	*0.50
Anxiety	6.27	.003	0.71	0.83	*0.32
Hostility	5.45	.006	0.73	0.87	*0.29
Somatization	1.76	.179	0.84	0.56	0.53
Phobic Anxiety	2.16	.123	0.48	0.71	0.36
Psychoticism	2.60	.082	0.58	0.62	0.32
Paranoid Ideation	6.81	.002	0.86	1.23	*0.52
Interpersonal Sensitivity	5.25	.008	0.81	0.80	*0.35
Obsession-Compulsion	2.30	.108	0.87	1.00	0.60
Percent Proof-reading not found	2.24	.115	67.73	55.55	54.13
Epinephrine	1.50	.235	9.38	9.32	6.47
Norepinephrine	1.21	.308	46.14	51.18	37.43

* Mean differs significantly from remaining two (Tukey's HSD; $p < .05$).

Table 7

Predictors of Stress Response Measures

Dependent Variables	Independent Variables	Standardized Beta	p
Positive Symptom Total	1. DH 2. P	.43 -.25	.001 .028
Depression	1. DH	.43	.001
Anxiety	1. DH 2. Posnum 3. N	.38 -.29 .26	.002 .020 .037
Hostility	1. P 2. DH	-.22 .22	.070 .078
Phobic Anxiety	1. DH 2. N 3. Setup	.42 .39 .20	.001 .001 .071
Somatization	1. DH	.24	.061
Interpersonal Sensitivity	1. DH 2. P	.35 -.25	.004 .037
Paranoid Ideation	1. DH 2. Setup	.36 .22	.003 .066
Psychoticism	1. DH 2. P	.36 -.27	.003 .017
Obsession-Compulsion	1. DH	.27	.032
Percent Proof-reading Not Found	1. P	-.25	.050
Epinephrine	1. P	-.30	.048
Norepinephrine	NONE	-	-

Legend: DH - number of daily hassles listed
 P - score on Perceived Emotional Support subscale
 Baum's Social Support Scale
 POSNUM - number of positively rated supporters listed on
 the Psychosocial Network Inventory
 SETUP - architectural layout (0=courts, 1=straights)
 N - score on the Perceived Neighbor Support subscale of
 Baum's Social Support Scale

Table 8

Two way analyses of variance with
Perceived Emotional Support (PSS) and Daily Hassles (DH)

DV	PSS		DH		PSSxDH	
	F	p	F	p	F	p
PST	1.96	.150	10.21	.002	.18	.840
Dep	1.11	.335	10.44	.002	.86	.427
Anx	3.35	.042	8.48	.005	1.14	.326
Hostility	3.14	.050	4.27	.043	2.25	.114
Som	1.86	.165	3.05	.086	.16	.856
Phob Anx	0.48	.624	5.39	.024	1.40	.254
Psych	0.97	.384	8.13	.006	.26	.770
Par Idea	2.88	.064	12.67	.001	.06	.937
Interp	3.40	.040	5.12	.027	.02	.977
O-C	0.34	.713	6.71	.012	.36	.701
PPCTNF	2.68	.077	4.81	.032	3.61	.033
EPI	1.60	.215	0.60	.444	.37	.693
NOREPI	1.11	.338	0.13	.719	1.52	.230

PST - Positive Symptom Total

DEP - Depression

ANX - Anxiety

HOS - Hostility

SOM - Somatization

PHOB ANX - Phobic Anxiety

PSYCH - Psychoticism

PAR IDEA - Paranoid Ideation

INTERP - Interpersonal Sensitivity

O-C - Obsession-Compulsion

PPCTNF - Percent proofreading not found

EPI - Urinary epinephrine

NOREPI - Urinary norepinephrine

Table 9

Predictors of neighborhood satisfaction

<u>Dependent Variable</u>	<u>Independent Variable</u>	<u>Beta</u>	<u>p</u>
How satisfied are you with your neighborhood?	1. N	.25	.049
	2. DH	-.22	.065
	3. SETUP	-.21	.089
How friendly is your neighborhood?	1. N	.30	.017
How often do you do things with your neighbors?	1. N	.59	.001
	2. POSFAR	.27	.017
	3. P	-.19	.081
How comfortable do you feel asking your neighbors to watch your house while you are away on vacation?	1. POSCLOSE	.37	.002
	2. SETUP	-.25	.032
How often do you feel left out by your neighbors?	1. POSCLOSE	-.40	.006
	2. N	.34	.018
Do you do things with your neighbors? (0=no, 1=yes)	1. N	.44	.001
How often do you include your neighbors in the things you do?	1. N	.35	.006
How much do you have in common with your neighbors?	1. N	.30	.029
	2. POSCLOSE	.23	.085
How much do you enjoy the company of your neighbors?	1. N	.47	.001
How much time do you want to spend with your neighbors?	1. N	.29	.025
How much do you like your neighbors?	1. N	.40	.001
	2. SETUP	-.18	.140

Legend: N - neighbor support subscale of Baum's Social Support Scale

DH - number of daily hassles endorsed

SETUP - architectural layout (courts=0, straights=1)

POSCLOSE - number of supporters who live within 2 or 3 buildings of the subject (PNI)

POSFAR - number of supporters who live further than 2 or 3 buildings from the subject (PNI)

Figure 1: The Buffering Hypothesis

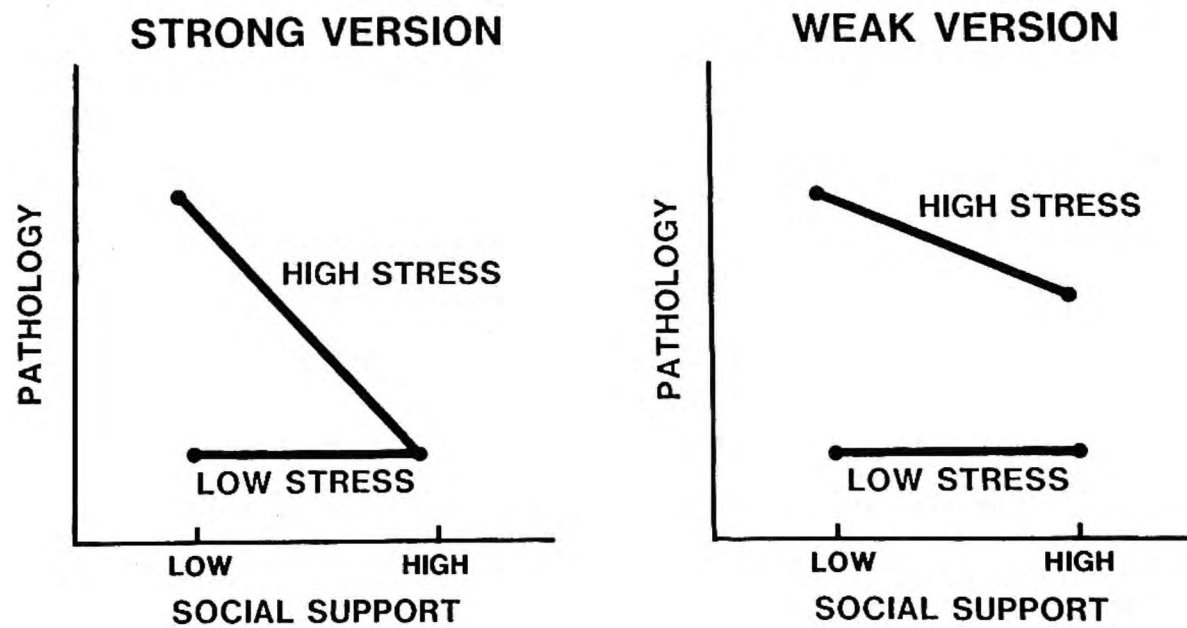


Figure 2: Diagram of a typical Westgate West building

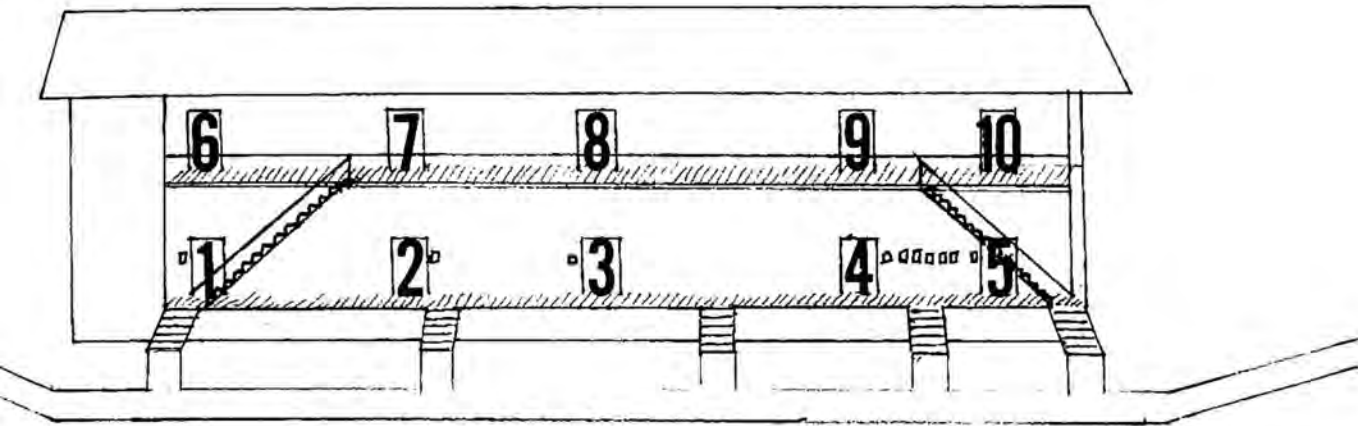


Figure 3: Diagram of a typical Westgate Court

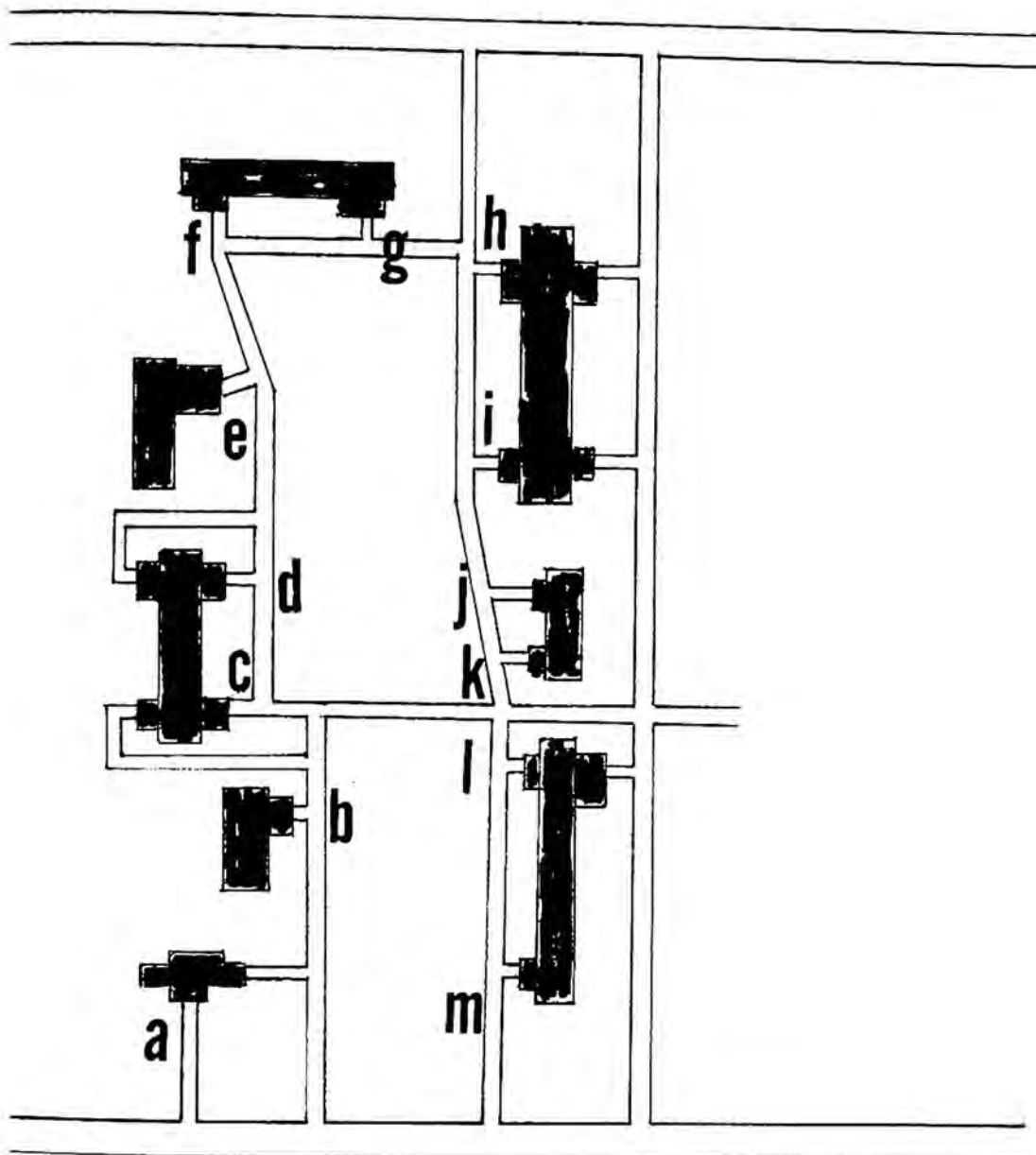


Figure 4: Court design (sociopetal)

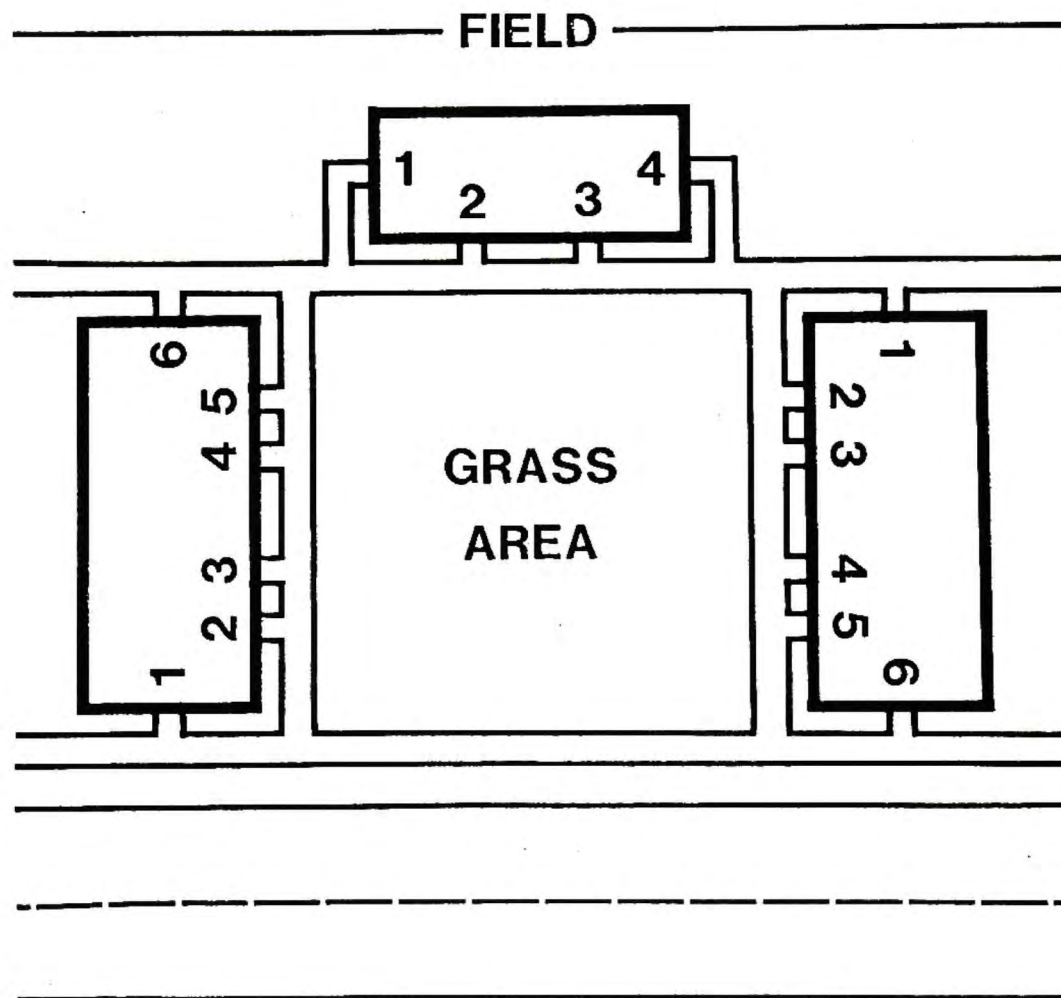


Figure 5: Single-loaded street design (sociofugal)

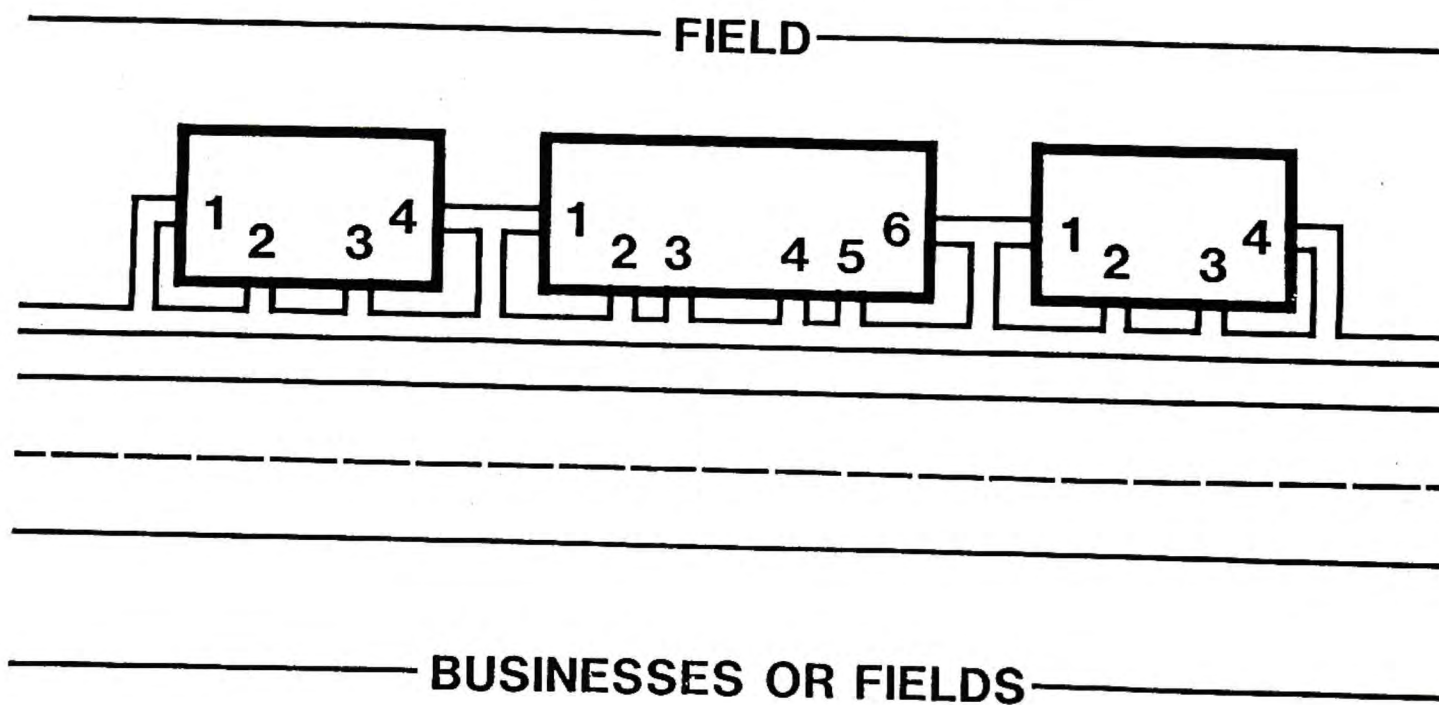


Figure 6: Total number of persons observed by observation day

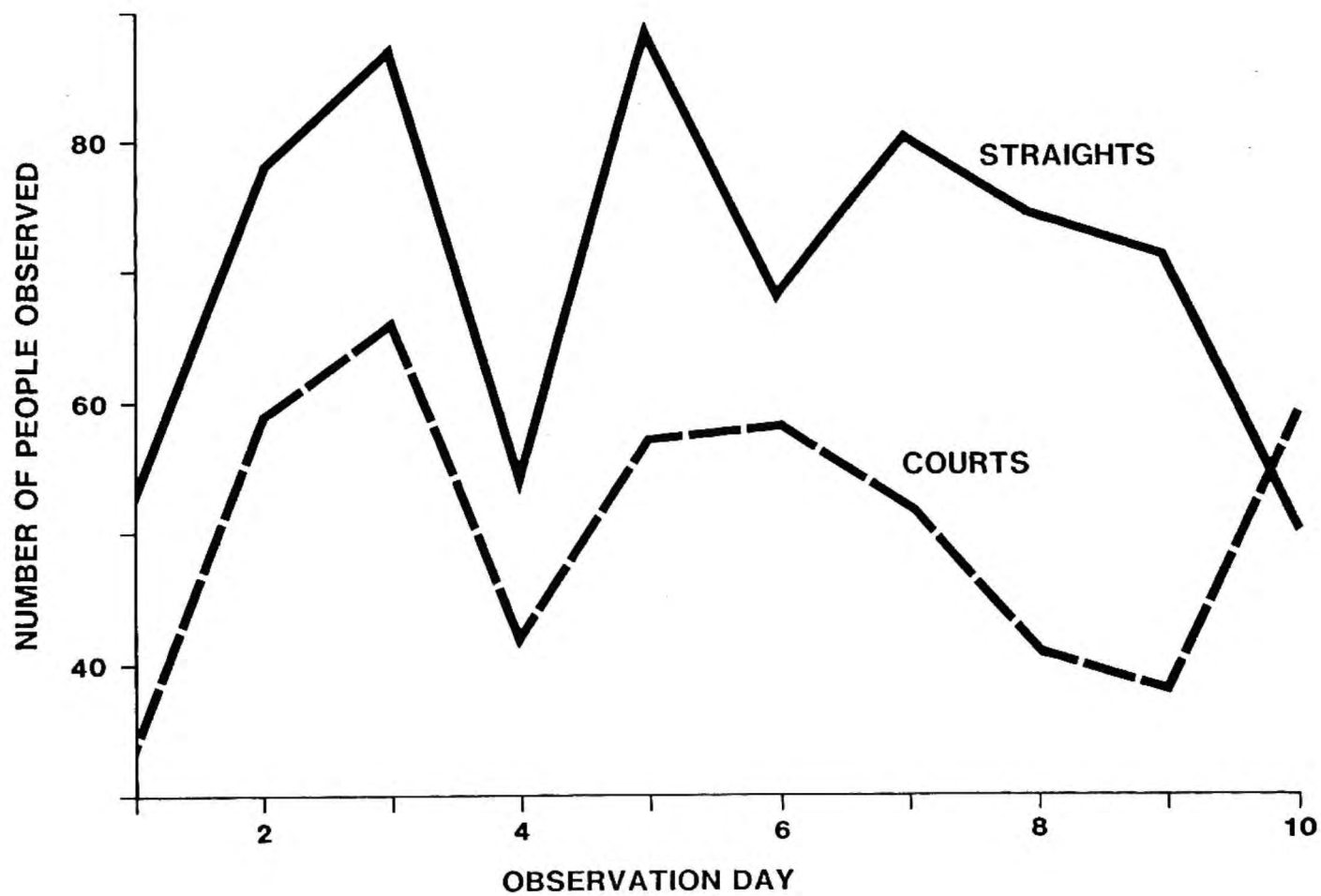
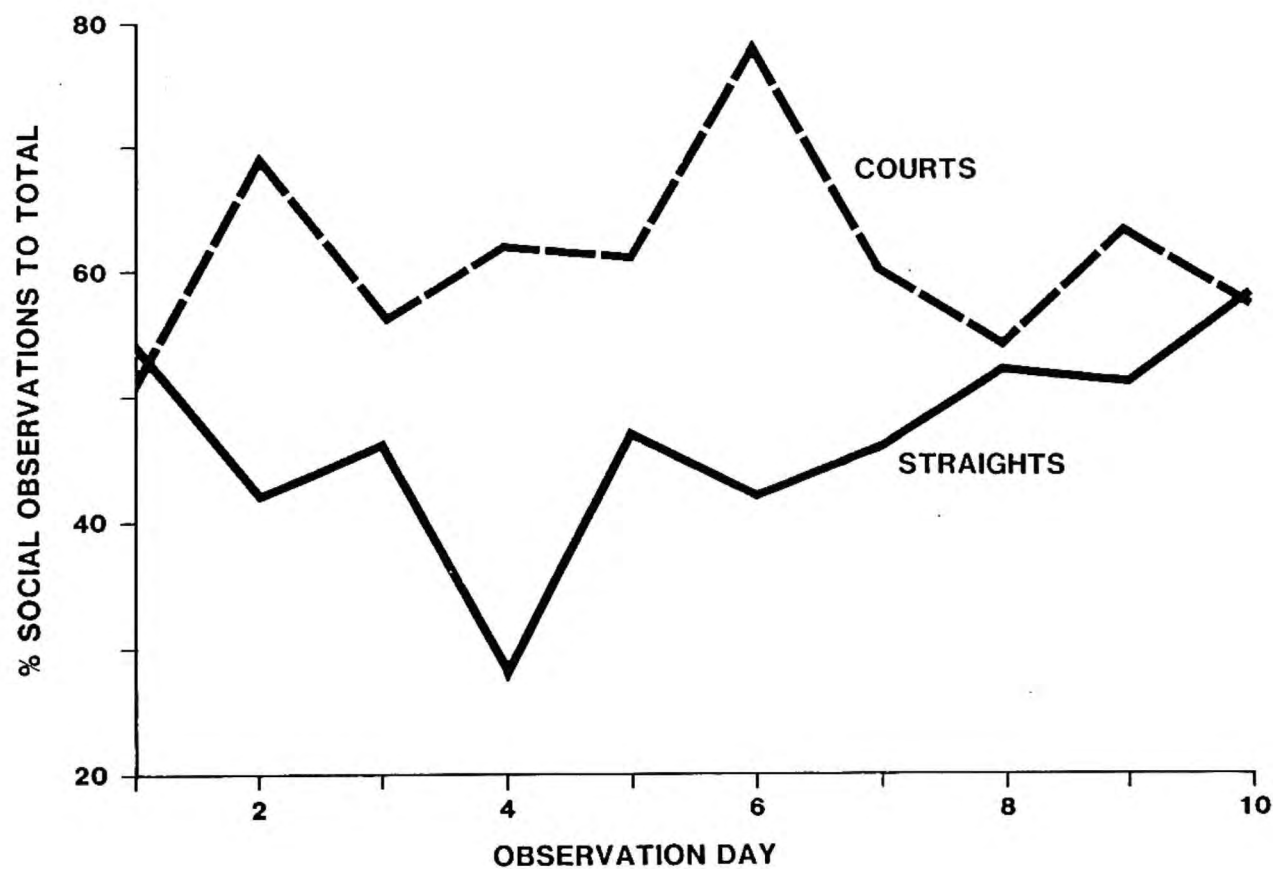


Figure 7: Percent of social observations to total by observation day



Appendix A
Study Script

Script

After a potential subject opens the door:

(E): Good afternoon. My name is _____ and I work for a researcher at the Uniformed Services University in Bethesda, Maryland. I'm conducting some research on the effects of city life and need to talk to some people in your neighborhood to find out how you feel about living in the city. I have a description of the research here (extends take consent form to the potential subject) that will tell you a little more about it.

This is a typical break point in the spiel that the E gives the potential subject where 3 alternative outcomes are likely:

1. The potential subject may quickly say that s/he is not interested in the study and begin to cut off the conversation. Although this does not occur in a large number of cases, the experimenters were instructed not to badger any potential subject into participating in the current research. If so, the E reads the questions and thanks the S for their time, leaving the doorway.

2. Another scenario involves a subject who immediately jumps at the proposition of being interviewed. In this case, the E will be asked inside and will finish completely describing the interview and have the S fill out the consent form. At this point, the test session begins.

3. Most typically, the potential S will have heard just enough to be curious but not enough to promptly agree to participate in the study. These persons will typically read

the consent form and ask a question or two in order to determine whether the interview will be worth their time and effort. For example, "Just how long does this interview take?" The E will respond by estimating the time required for the participant in the study and mentioning the fact that the S will be paid for his or her participation in the research. At this time, most subjects will consent to participate, but for those who still seem unsure, the E will reiterate the time involvement in answering the questions, the overall idea of the study and the fact that the S will be reimbursed for his or her time. Sometimes, a hesitant individual will ask what the questionnaires are all about. The E responds to this question saying, "There are questions concerning your attitudes and beliefs about living in the city in general and about living in your neighborhood more specifically... If you wish, you may look at the questionnaires, but most people find the questions thought provoking and interesting..." It is very rare that an individual remains undecided for very long, and what has transpired up to this point will undoubtedly lead to a decision by the potential S.

The Interview

The E follows the order of presentation listed in Appendix D.

1. The Proofreading Test: (E): This is a proofreading task in which there are errors embedded in a passage. Your job is to find as many of the errors as you can within the 5 minute time period of the task. You should work as quickly and as accurately as possible. The directions

on top will let you know what kinds of errors to expect in the passage (hands the Proofreading Test to the S). Once the S has finished reading the instructions, E reiterates each of the examples on the front cover in the order that they appear and asks if S has any questions. If not, S is told to turn the page and begin and E sets the stopwatch for 5 minutes. If S has any questions, E clarifies the instructions further.

2. SCL-90: (E): This is a check list which contains 90 problems that you may or may not have experienced in the last 2 weeks including today. E then says (while turning the page), "For instance, for headaches... if you have not had any headaches in the past two weeks, then you would look at the other four boxes and determine if the headaches have bothered you 'a little bit', 'moderately', 'quite a bit' or 'extremely' in the past 2 weeks.

3. Baum Social Support Scale: (E): Here is a list of statements that we want you to rate how much you agree or how much you disagree with each statement. For example, on the first statement, (E reads the second sentence of the directions)... "if you agree strongly, you might pick '1'..."

4. Psychosocial Network Inventory: (E): On this questionnaire, we want you to list the important people in your life. (E begins to paraphrase the instructions on the front page of the inventory using the entry "Joe" as an example. E goes through each one of the questions and how they were answered.

5. Stressful Life Events: (E): We all have changes

in our lives from time to time and this scale measures the changes that you have experienced in the past year. Although there are many entries on this questionnaire, no one is expected to have experienced all of these changes within the past year. Your job is to go through the list and mark each of the changes that you have experienced, noting whether the change occurred in the past 6 months, or from 6 months to one year ago. For example, (E goes over the example with S until certain that S understands what the questionnaire is requiring of him/her).

6. Daily Hassles: (E): Although many big events were listed on the last questionnaire,, it is also important for us to know how uou feel about the everyday pressures that you may have experienced in the past month. E paraphrases the instructions.

7. Neighborhood: (E): We are interested in how you feel about the neigh;borhood that you live in. On this questionnaire, you will find questions about neighborhood life in general, and your own neighborhood in specific. You'll notice that these questions are of the same format that you have already filled out, that is... E goes over the response to a 7-point question.

8. Perceived Stress Scale: (E): This last scale has only 14 items that we would like you to fill out. EACH item is filled out according to how you have felt in the past month only. E paraphrases the instructions.

9. Urinary catecholamines: (E): It is very helpful to our research if we can get an idea of what some of the

hormones in your body are doing in response to your living in a city. In this manner, we can compare your responses on the questionnaires you have filled out with these people, too. The urine sample is very simple. All that we want is for you to use the bucket every time you have to urinate between 6 o'clock this evening to 9 o'clock tomorrow morning. During this time, we would like you to circle any foods that you eat that are on this list (the amine-producing foods sheet). (E always shows S that E is putting the preservative into the bucket, so that S knows that it belongs in there and will not empty it out). Also, if you are taking any prescription or over the counter drugs, please list them at the bottom of the page. The reason we have you do this is because the tests that we do on the urine may be influenced by medications that you are taking.

The subject is then paid, thanked and asked when a good time would be to pick up the urine sample and food sheet. Also, the subject is reminded that when the data are analyzed, they will be recontacted and told more about the study and the findings.

Appendix B
Urine Procedure Sheet

INSTRUCTIONS FOR 15 HOUR URINE SAMPLE

Please provide as complete a sample of urine as possible. The sample should be collected between the hours of 6 PM and 9 AM. All samples possible should be collected, however, if you should forget a sample, do not worry about it. Do not, however, mix your sample with a sample belonging to somebody else.

Please keep the urine refrigerated after each sample is collected. We will be back tomorrow to pick it up.

- Remember:
1. All urine excreted between the hours of 6 PM and 9 AM should be collected.
 2. The should be kept refrigerated after each collection.
 3. The sample will be picked up tomorrow.
 4. The Food Sheet should be filled out to show those foods that you actually consumed during the time period from 6 PM to 9 AM.

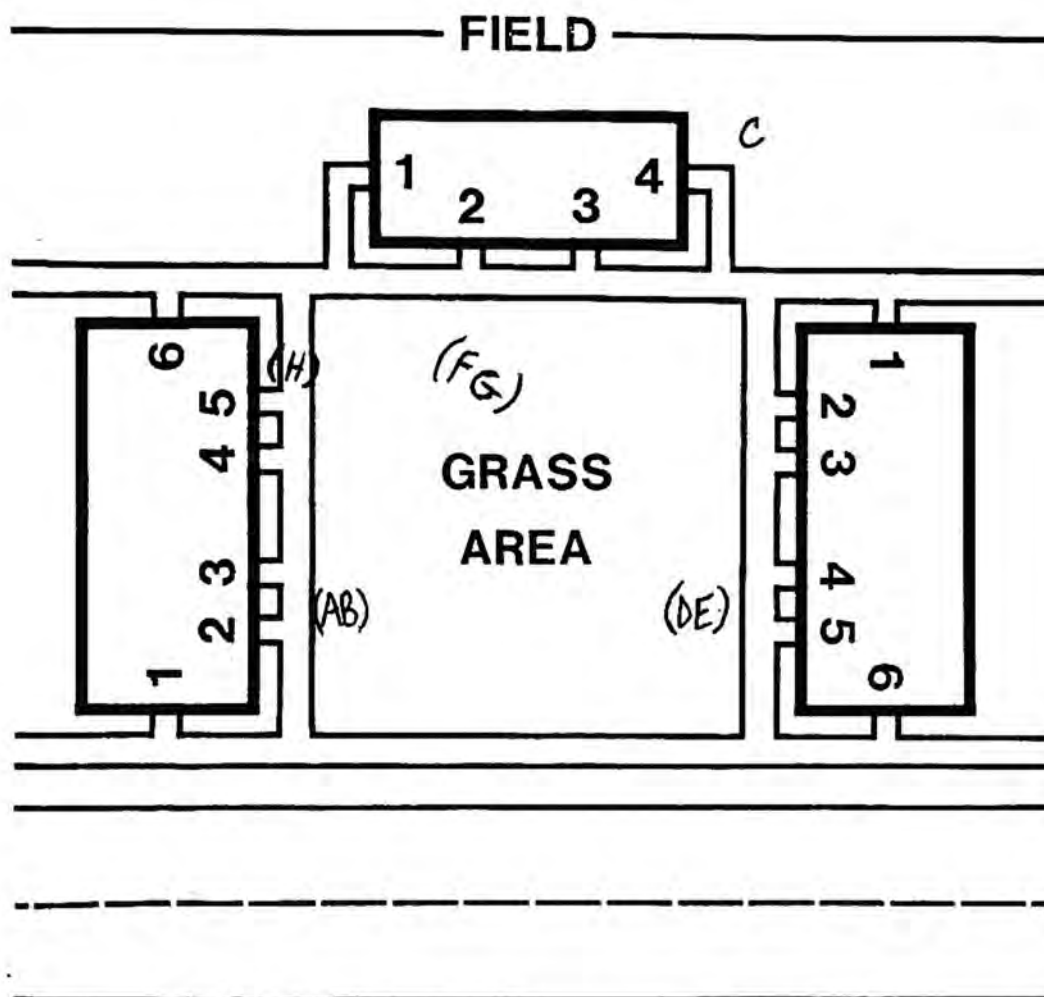
Your urine is going to be frozen for assays which will allow us to determine your arousal level. All information will be kept strictly confidential. We sincerely thank you for your help and cooperation.

Appendix C
Mapping Procedure

Behavioral Mapping

The attached sheet contains a sample behavioral mapping form with hypothetical inputs. Within this court, eight people were observed during this particular mapping session (e.g., 15 minutes). Person H was the only person observed of the eight to be present within the court and not to have interacted with any other person present. Person C, while also remaining alone by his/her door, was noticed to have waved to someone during the period. This wave was recorded at the bottom of the sheet. Three dyads were also observed during the mapping interval (A-B, D-E, and F-G). Both A-B and D-E were observed to be talking to one another at the edge of the sidewalk closest to the end apartments of the court design.

With this mapping procedure it is possible to code more than one observation per person per mapping period, but it is beyond the scope of the observer to keep accurate enough track of all observed individuals in order to accurately describe sequences of events occurring within the mapping site. Thus, it is not possible to specify percentages of time spent by any individual under each of the behavioral categories listed.



Date: Time: Street Address:

Walking	
Talking	(AB) (DE)
Sitting	H
Standing	ABCDE
Working	
Playing	(FG)
Waving/Nodding	C
Door-to-door	
Other	

Appendix D
Measures Summary Sheet

Measures

1. Independent Measures: The Neighborhood Scale
Stressful Life Events
Daily Hassles Scale

These measures all deal with stressful inputs for the residents of the neighborhoods. They were intended as indicators of actual environmental inputs with which the residents must deal in order to adapt to their living situation.

2. Dependent Measures: Social Support
Baum's social support scale
Psychological Network Inventory

Stress Responding

Affective responses:

SCL-90

Cohen's perceived stress scale

Behavioral responses:

proofreading task

Physiological responses:

urinary catecholamine (E and NE)

Order of Presentation to Subjects:

1. Proofreading test
2. SCL-90
3. Baum social support scale
4. Psychological Network Inventory
5. Stressful Life Events
6. Daily Hassles
7. Neighborhood Scale
8. Perceived Stress Scale
9. Urinary catecholamines (E and NE)

Scoring:

1. Proofreading test - subject was given 5 minutes to find as many errors as possible. When the time was up, the E underlined the last sentence read by the S. The proofreading test was scored for the percentage of proofreading errors not found out of the total possible for the amount of the passage read by the subject (thus, helping to control for reading speed).

2. SCL-90 - The Symptom Checklist 90 is a list of symptoms experienced commonly. Nine subscales are scored on this scale: depression, anxiety, hostility, phobic anxiety, psychoticism, paranoid ideation, interpersonal sensitivity, obsession-compulsion, somatization. Also, a global indicator of symptom reporting is scored by summing all

endorsed items (positive symptom total). Subscales consist of items which may be checked on a continuum from 0 to 4 (not-at-all to extremely). The numerical values of the subscale items are tallied and the total is divided by the number of items comprising the subscale. This yields a "severity" index for each subscale. Total symptom reporting was derived from the number of items out of the 90 checked.

3. Baum's social support scale - Subjects answered 26 Likert-type items (7-point scales: Strongly Disagree to Strongly Agree). Subscales on the social support scale included perceived emotional support, importance of support, history of support, support from family, support from friends, and neighborhood support.

4. Psychological Network Inventory - This support scale is based upon the subject's listing of all the social supports that he/she can come up with (categorized as family, friends, relatives, co-workers, others), and for each listing, questions (5-point) further qualify the kind of support, the contact, the strength of the relationship and a rating of the overall support received from each source. For the purposes of this study, the distance that the subject lived from the supporter was asked also.

5. Stressful Life Events - This measure of life events distinguishes between events occurring within the past 6 months and those occurring between 6 months to 1 year ago. A list of 60 events was read by the subject and only those events actually encountered during either of the two time periods were rate for their overall negativeness or positiveness (7-point scale). For the purposes of this study a count of the life events checked served as the overall life events value.

6. The Daily Hassles Scales - This scale was developed to be sensitive to acute hassles which may be considered as requiring adaptive energy. The subject first goes through the list of 118 items, quickly circling only those items which have happened to him or her in the past month. After that, each of the circled items is rated on a 3-point severity scale. In this way, a measure of not only the number of hassles occurring within the last month, but also the severity of these disruptions of daily life can be examined.

7. The neighborhood Scale - This scale was developed by Baum and was used in investigations of neighborhood crowding. The scale consists of a group of questions directed at actual and perceived levels of stressors within one's neighborhood. Subjects in the present study were compared for their responses on this questionnaire, focusing primarily upon ratings of "objective" stressors within the neighborhood (e.g., traffic).

8. The Perceived Stress Scale - This is a 14 item scale

of 5-point, Likert type questions. The subject's perceptions of control, overload, and self-evaluated coping response to stressors experienced during the past month.

9. Urinary catecholamines (E and NE) - These adrenal hormones are taken as indicators of overall sympathetic nervous system activity and reflect sympathetic arousal levels in the subject. They are subject to a number of biases, including movement (exercise), drug intake (e.g., caffeine, amphetamines) and amine-producing food intake (e.g., cheeses) which may alter the levels given by the assay.

Instructions - Instructions were clearly printed at the top of the first page of each of the questionnaires and E reviewed these instructions with the subject until satisfied that they were understood.

Appendix E
Consent Form



MEDICAL PSYCHOLOGY

UNIFORMED SERVICES UNIVERSITY
OF THE
HEALTH SCIENCES
SCHOOL OF MEDICINE
4301 JONES BRIDGE ROAD
BETHESDA, MARYLAND 20814



TEACHING HOSPITALS
WALTER REED ARMY MEDICAL CENTER
NATIONAL NAVAL MEDICAL CENTER
MALCOLM GROW AIR FORCE MEDICAL CENTER
WILFORD HALL AIR FORCE MEDICAL CENTER

CONSENT FORM FOR RESEARCH PARTICIPATION

PLEASE READ CAREFULLY

Title of Study: Responses to living in city neighborhoods

We are studying social and psychological responses to living in urban areas. In order to do this, we need to have people living in your neighborhood and in other neighborhoods answer a number of questions and complete a task. We will be comparing responses by people living in different neighborhoods. We are asking that you help us by participating. We will pay you \$10 for your participation. Data will be used to help understand how people respond to living in cities.

We are interested in getting to know you and evaluating some of your attitudes, beliefs, and personal characteristics. In order to accomplish this, we will ask you a number of questions concerning your background. We may also ask you to work on a task.

Possible inconvenience or discomfort from this study involves possible frustration on the task. We will compensate you for the time you spend in helping us conduct this study. Other than this, you will not directly benefit from this study, but the study may contribute information about how people respond to living in cities.

Your participation in this study is entirely voluntary and all data collected will be strictly confidential. The only copies of the data collected will remain in our research file. The data will be published in scientific journals, but data will not be published in any manner that can identify you.

If you decide to participate, you may withdraw or discontinue participation at any time for any reason without prejudice. If you have any questions, we expect you to ask us.

This study does not entail any physical or mental risk beyond those described above. The study is concerned with your performance on a task and you will not be exposed to any threatening or harmful events. If, however, you become uncomfortable during the study, sufficiently uncomfortable that you would like to end the session, tell us. We do not expect this to occur, but if, for any reason, you feel that continuing would constitute a hardship, please tell us and we will end the session. We want you to know, however, that the Department of Defense will provide medical care for DOD eligibles (active duty, dependents, and retired military) for physical injury or illness resulting from participation in this DOD-approved research. Such care may not be available to other research participants. Compensation may be available through judicial avenues to non-active duty research participants if they are injured through negligence (fault of the government).

If you believe you have suffered any injury or illness as a result of participating in this research, please contact the Office of Grants Management, (301) 295-3303, at the University. This office can review the matter with you and may be able to identify resources available to you. Information about judicial avenues of compensation is available from the University's Legal Counsel, (301) 295-3028.

If you desire additional information about this experiment, either about the rationale for it or its findings, you may call the Department of Medical Psychology, (301) 295-3270, to obtain information about it. In this way, you can make your participation in our research a more informative, educational experience. We welcome your comments and suggestions, and appreciate your willingness to help us.

YOU ARE MAKING A DECISION WHETHER OR NOT TO PARTICIPATE. YOUR SIGNATURE INDICATES THAT HAVING READ THE ABOVE INFORMATION, YOU HAVE DECIDED TO PARTICIPATE.

SIGNATURE

DATE

I was present during the explanation referred to above, as well as during the Volunteer's opportunity to ask questions. I hereby witness the Volunteer's signature.

SIGNATURE

Appendix F
Proofreading Task

PROOFREADING TASK

Your task will be to proofread a passage and to circle any mistakes that you find. Below you will find examples of some common types of errors.

	<u>Mistake</u>	<u>Correct</u>
Misspellings	decrease	decrease
Typographical errors	ata	at a
Punctuation errors	Moreover; it is	Moreover, it is
Capitalization errors	eugene, oregon	Eugene, Oregon
Incorrect word	the dear ran	the deer ran
Verb error	the students takes	the students take

Your task will be to find the errors and circle them. Read the passage from left to right and do not skip any lines.

* * Here is an example of what your task is like:

When sufficient people begin to stay in a slum by (choice.) several other (importantthings) also begin to (happens.)

Please do not begin work until the experimenter gives you the signal.

EROSION OF CITIES OR ATTRITION OF AUTOMOBILES

Today everyone who values cities is disturbed by automobiles. Traffic arteries, along with parking lots, gas stations and drive-ins, are powerful and insistent instruments of city destruction. To accommodate them, city streets are broken down into loose sprawls, incoherent and vacuous for anyone afoot. Downtowns and other neighborhoods that are marvels of close-grained intricacy and compact mutual support are casually disemboweled. Landmarks are crumbled or are so sundered from their contexts in city life as to become irrelevant trivialities. City character is blurred until every place becomes more like every other place, all adding up to Noplace. And in the areas most defeated, uses that cannot stand functionally alone--shopping malls, or residences, or places of public assembly, or centers of work--are severed from one another.

But we blame automobiles for too much. Suppose automobiles had never been invented, or that they had been neglected and we traveled instead in efficient, convenient, speedy, comfortable, mechanized mass transit. Undoubtedly we would save immense sums which might be put to better use. But they might not.

For suppose we had also been rebuilding, expanding and reorganizing cities according to the project image and the other anti-city ideals of conventional planning,

We would have essentially the same results as I blamed on automobiles a few paragraphs back. These results can be repeated word for word: The city streets would be broken down into loose sprawls, incoherent and vacuous for anyone afoot. Downtowns and other

-2-

neighborhoods that are marvels of close-grained intricacy and compact mutual support would be casually disemboweled. Landmarks would be crumbled or so sun dered from their contexts in city life as to become irrelevant trivialities. City character would be blurred until every place became more like every other place, all adding up to Noplace. And in the areas most defeated, etc.

And then the automobile would have to be invented or would have to be rescued from neglect). For people to live or work in such inconvenient cities, automobiles would be necessary to spare them from vacuity, danger and utter institutionalization.

It is questionable how much of the destruction wrought yb automobiles on cities is really a response to transportation and traffic needs, and how much of it is owing to sheer disrespect for other city needs, uses and functions. like city rebuilders who face a blank when they try to think of what to do instead of renewal projects, Because they know of no other respectable principles for city organization, just so, highwaymen, traffic engineers and city rebuilders, again, face a, blank when try to think what they can realistically do, day by day, except try to overcome traffic kinks as they occur and apply what foresight they can toward moving and storing more cars in the future. It is impossible for responsible and practical men to discard unfit tactics--even when the results of their own Work cause them misgivings--if the Alternative is to be left with confusion as to what to try instead and why.

Good transportation and, communication are not only among the most difficult things to achieve; they are also basic necessities. The point

-3-

of cities is multiplicity of choice. It is impossible to take advantage of multiplicity of choice without being able to get around easily. Nor will multiplicity of choice even exist if it cannot be stimulated by cross-use. Furthermore, the economic foundation of cities is trade. Even manufacturing occurs in cities mainly because of attached advantages involving trade, not because it is easier to manufacture things in cities. Trade in ideas, services, skills and personnel, and certainly in goods, demands efficient, fluid transportation and communication.

But multiplicity of choice and intensive city trading depend also on immense concentrations of people and on intricate minglings of uses and complex interweavings of paths.

How to accommodate city transportation without destroying the related intricate and concentrated land use?--this is the question. Or, going at it the other way, how to accommodate intricate concentrated city land use without destroying the related transportation?

Nowadays there is a myth that city streets, so patently inadequate for floods of automobiles, are antiquated vestiges of horse-and-buggy conditions, suitable to the traffic of their time, but . . .

Nothing could be less true. To be sure, the streets of eighteenth- and nineteenth-century cities were usually well adapted, as streets, to the uses of people afoot and to the mutual support of the mingled uses bordering them. But they were miserably adapted, as streets, to horse traffic, and this in turn made them poorly adapted in many ways to foot traffic too.

-4-

Victor Gruen, who devised a plan for an automobile-free downtown for Fort Worth, Texas, about which I shall say more later in this chapter, prepared a series of slides to explain his scheme. After a view of a street with a familiar-looking automobile jam he showed a surprise: just about as bad a jam of horses-and vehicles in an old photograph of Fort Worth.

What street life was like for really big and intense cities and their users in the horse-and-buggy days has been described by an English architect. the late H. B. Cresswell, who wrote for the British Architectural Review of December 1958 a description of London in 1890, when he was a young man:

The Strand of those days . . . was the throbbing heart of the people's essential London. Hedged by a maze of continuous alleys and courts, the Strand was fronted by numbers of little restaurants whose windows vaunted exquisite feeding; taverns, dives, oyster and wine bars, ham and beef shops; and small shops marketing a lively variety of curious or workaday things all standing in rank, shoulder to shoulder, to fill the spaces between its many theatres . . . But the mud! And the noise! And the smell! All these blemishes were the mark of the horse . . .

The whole of London's crowded wheeled traffic--which in parts of the City was at times dense beyond movement--was dependent on the horse: lorry, wagon, bus, hansom and "growler," and coaches and carriages and private vehicles of all kinds, were appendages to horses. Meredith refers to the "anticipatory stench of its

-5-

cab-stands" on railway approach" to London: but the characteristic aroma--for the nose recognized London with gay excitement--was of stables, which were commonly of three or four storeys with inclined ways zigzagging up the faces of them; their middens kept the castiron filigree chandeliers, that glorified the reception rooms of upper and lower middle class homes throughout London, encrusted with dead flies and, in late summer, veiled with jiving clouds of them.

A more assertive, mark of the horse was the mud that, despite the activities of a numerous corps of red-jacketed boys who dodged among wheels and hooves with pan and brush in service to iron bins at the pavement-edge, either flooded the streets with churnings of "pea soup" that at times collected in pools overbrimming the curbs, and at others covered the road-surface as with axle grease or bran-laden dust to the distraction of the wayfarer. In the first case, the swift-moving hansom or gig would fling sheets of such soup--where not intercepted by trousers or skirts--completely across the pavement . . . The pea-soup Condition was met by wheeled "mud-carts" each attended by two ladlers clothed as for Icelandic seas in thigh boots, oilskins collared to the chin, and sou'westers sealing in the back of the neck. Splash Ho! The foot passenger now gets the mud in his eye! The axle-grease condition were met by horse-mechanized brushes and travelers in the small hours found fire-hoses washing away residues . . .

And after the mud the noise which, again endowed by the horse, surged like a mighty heartbeat in the central districts of London's

-6-

life, It was a thing beyond all imaginings. The streets of workaday London were uniformly Paved in "granite" sets . . . and the hammering of a multitude of iron-shod hairy heels upon them, the deafening, side-drum tattoo of tired wheels jarring from the apex of one set to the next like sticks dragging along a fence; the creaking and groaning and chirping and rattling of vehicles, light and heavy, thus maltreated; the jangling of chain harness and the clanging or jingling of Every other conceivable thing else, augmented by the shrieking and bellowings called for from those of God's creatures who desired to impart information or proffer a request vocally--raised a din that . . . is beyond conception. It was not any such paltry thing as noise. It was an immensely of sound . . .

This was the London of Ebenezer Howard, and it is hardly surprising that he regarded city streets as unfit for human beings.

Le Corbusier, when he designed his Radiant City of the 1920s, as a park, skyscraper and automobile freeway version of Howard's small-town Garden City, Flattered himself that he was designing for a new age and, along with it, for a new system of traffic. He was not. So far as the new age was concerned, he was merely adapting in a shallow fashion reforms that had been a response to nostalgic yearnings for a bygone simpler life, and a response also to the nineteenth century of the horse (and the epidemic) So far as the new system of traffic was concerned, he was equally shallow. He embroidered (and I think that is a fair word for his approach) freeways and traffic onto his radiant City scheme in

-7-

quantities that apparently satisfied his sense of design, but that bore no relationship whatsoever to the Hugely greater quantities of automobiles, amounts of roadway and extent of parking and servicing which would actually be necessary for his repetitive vertical concentrations of people, separated by vacuities. His vision of skyscrapers in the park degenerates in real life into skyscrapers in parking lots. And there can never be enough parking.

The present relationship between cities and automobiles represents, in short, one of those jokes that history sometimes plays on progress. The interval of the automobiles's development as everyday transportation has corresponded precisely with the interval during which the ideal of the suburbanized anti-city was developed architecturally, sociologically, legislatively and financially.

But automobiles are hardly inherent destroyers of cities). If we would stop telling ourselves fairy tales about the suitability and charm of nineteenth-century streets for horse-and-buggy traffic, we would see that the internal combustion engine, as it came on the scene, was potentially an excellent instrument for abetting city intensity, and at the same time for liberating cities from one of their noxious liabilities.

Appendix G
Symptom Checklist 90R

INSTRUCTIONS
Symptom Checklist-90

Below is a list of problems and complaints that people sometimes have. Please read each one carefully. After you have done so please circle one of the numbers to the right that best describes HOW MUCH THAT PROBLEM HAS BOTHERED OR DISTRESSED YOU DURING THE PAST 2 WEEKS INCLUDING TODAY. Mark only one circle for each item.

For example, if you have experienced a backache recently and it bothered you constantly in all postures you might circle the 5 below.

not at	a little	moderately	quite	extremely
all	bit		a bit	
1	2	3	4	5

	not at all 1	a little bit 2	moderately 3	quite a bit 4	extremely 5
HOW MUCH WERE YOU BOTHERED BY:					
1. Headaches	1	2	3	4	5
2. Nervousness or shakiness inside	1	2	3	4	5
3. Unwanted thoughts, words, or ideas that won't leave your mind	1	2	3	4	5
4. Faintness or dizziness	1	2	3	4	5
5. Loss of sexual interest or pleasure	1	2	3	4	5
6. Feeling critical of others	1	2	3	4	5
7. The idea that someone else can control your thoughts	1	2	3	4	5
8. Feeling that others are to blame for most of your troubles	1	2	3	4	5
9. Trouble remembering things	1	2	3	4	5
10. Worried about sloppiness or carelessness	1	2	3	4	5
11. Feeling easily annoyed or irritated	1	2	3	4	5
12. Pains in heart or chest	1	2	3	4	5
13. Feeling afraid in open spaces or on the streets	1	2	3	4	5
14. Feeling low in energy or slowed down	1	2	3	4	5
15. Thoughts of ending your life	1	2	3	4	5
16. Hearing voices that other people do not hear	1	2	3	4	5
17. Trembling	1	2	3	4	5
18. Feeling that most people cannot be trusted	1	2	3	4	5
19. Poor appetite	1	2	3	4	5
20. Crying easily	1	2	3	4	5
21. Feeling shy or uneasy with the the opposite sex	1	2	3	4	5
22. Feelings of being trapped or caught	1	2	3	4	5
23. Suddenly scared for no reason	1	2	3	4	5
24. Temper outbursts that you could not control	1	2	3	4	5
25. Feeling afraid to go out of your house alone	1	2	3	4	5
26. Blaming yourself for things	1	2	3	4	5
27. Pains in lower back	1	2	3	4	5
28. Feeling blocked in getting things done	1	2	3	4	5
29. Feeling lonely	1	2	3	4	5
30. Feeling blue	1	2	3	4	5
31. Worrying too much about things	1	2	3	4	5
32. Feeling no interest in things	1	2	3	4	5
33. Feeling fearful	1	2	3	4	5
34. Your feelings being easily hurt	1	2	3	4	5
35. Other people being aware of your private thoughts	1	2	3	4	5

	not at all 1	a little bit 2	moderately 3	quite a bit 4	extremely 5
36. Feeling others do not understand you or are unsympathetic	1	2	3	4	5
37. Feeling that people are unfriendly or dislike you	1	2	3	4	5
38. Having to do things very slowly to insure correctness	1	2	3	4	5
39. Heart pounding or racing	1	2	3	4	5
40. Nausea or upset stomach	1	2	3	4	5
41. Feeling inferior to others	1	2	3	4	5
42. Soreness of your muscles	1	2	3	4	5
43. Feeling that you are watched or talked about by others	1	2	3	4	5
44. Trouble falling asleep	1	2	3	4	5
45. Having to check and double check what you do	1	2	3	4	5
46. Difficulty making decisions	1	2	3	4	5
47. Feeling afraid to travel on buses, subways, trains	1	2	3	4	5
48. Trouble getting your breath	1	2	3	4	5
49. Hot or cold spells	1	2	3	4	5
50. Having to avoid certain things, places, or activities	1	2	3	4	5
51. Your mind going blank	1	2	3	4	5
52. Numbness or tingling in parts of your body	1	2	3	4	5
53. A lump in your throat	1	2	3	4	5
54. Feeling hopeless about the future	1	2	3	4	5
55. Trouble concentrating	1	2	3	4	5
56. Feeling weak in parts of your body	1	2	3	4	5
57. Feeling tense or keyed up	1	2	3	4	5
58. Heavy feelings in your arms or legs	1	2	3	4	5
59. Thoughts of death or dying	1	2	3	4	5
60. Overeating	1	2	3	4	5
61. Feeling uneasy when people are watching or talking about you	1	2	3	4	5
62. Having thoughts that are not your own	1	2	3	4	5
63. Having urges to beat, injure, or harm someone	1	2	3	4	5
64. Awakening in the early morning	1	2	3	4	5
65. Having to repeat the same actions as touching, counting, washing	1	2	3	4	5
66. Sleep that is restless or disturbed	1	2	3	4	5
67. Having urges to break or smash things	1	2	3	4	5
68. Having ideas or beliefs that others do not share	1	2	3	4	5

	not at all 1	a little bit 2	moderately 3	quite a bit 4	extremely 5
69. Feeling very self-conscious with others	1	2	3	4	5
70. Feeling uneasy in crowds, such as shopping or at a movie	1	2	3	4	5
71. Feeling everything is an effort	1	2	3	4	5
72. Spells of terror or panic	1	2	3	4	5
73. Feeling uncomfortable about eating or drinking in public	1	2	3	4	5
74. Getting into frequent arguments	1	2	3	4	5
75. Feeling nervous when you are left alone	1	2	3	4	5
76. Others not giving you proper credit for your achievements	1	2	3	4	5
77. Feeling lonely even when you are with people	1	2	3	4	5
78. Feeling so restless you could not sit still	1	2	3	4	5
79. Feelings of worthlessness	1	2	3	4	5
80. Feeling that familiar things are strange or unreal	1	2	3	4	5
81. Shouting or throwing things	1	2	3	4	5
82. Feeling afraid that you will faint in public	1	2	3	4	5
83. Feeling that people will take advantage of you if you let them	1	2	3	4	5
84. Having thoughts about sex that bother you a lot	1	2	3	4	5
85. The idea that you should be punished for your sins	1	2	3	4	5
86. Feeling pushed to get things done	1	2	3	4	5
87. The idea that something is seriously wrong with your body	1	2	3	4	5
88. Never feeling close to another person	1	2	3	4	5
89. Feelings of guilt	1	2	3	4	5
90. The idea that something is wrong with your name	1	2	3	4	5

Appendix H

Baum's Social Support Scale

1. Please rate the degree to which you agree or disagree with the following statements. If you agree strongly, you might pick "1," if you agree, but not strongly, you might pick "2" or "3." If you disagree, you would pick "5," "6," or "7," depending on how strongly you disagree. If you don't really agree or disagree, you would pick "4."

	Agree Strongly			Disagree Strongly			
	1	2	3	4	5	6	7
1. I often feel lonely, like I don't have anyone to reach out to							
2. When I am unhappy or under stress, there are people I can turn to for support.	1	2	3	4	5	6	7
3. I don't know anyone to confide in	1	2	3	4	5	6	7
4. I used to have close friends to talk to about things, but I don't anymore.	1	2	3	4	5	6	7
5. When I am troubled, I keep things to myself.	1	2	3	4	5	6	7
6. I am not a member of any social groups (such as church groups, clubs, teams, etc.)	1	2	3	4	5	6	7
7. I believe in myself and in my ability to handle new situations without any help from others.	1	2	3	4	5	6	7
8. It is important to me that I have emotional support from friends.	1	2	3	4	5	6	7
9. People should feel comfortable turning to a priest (minister, rabbi) for support and comfort.	1	2	3	4	5	6	7
10. I rarely ask for support from others.	1	2	3	4	5	6	7
11. I don't think people really need other people—they can do just as well on their own.	1	2	3	4	5	6	7
12. As a child I received a great deal of support from my parents.	1	2	3	4	5	6	7

PLEASE REMEMBER TO COMPLETE ITEMS 13-26 ON PAGE 2.

	Agree Strongly				Disagree Strongly			
	1	2	3	4	5	6	7	
13. My brothers and sisters were supportive of me.	1	2	3	4	5	6	7	
14. There were always people around when I was growing up who could help me when I needed it.	1	2	3	4	5	6	7	
15. I can turn to my parents or siblings when I am troubled.	1	2	3	4	5	6	7	
16. When I don't have my family's support, I feel more anxious about what I am doing.	1	2	3	4	5	6	7	
17. When I feel comfortable when asking my family for support.	1	2	3	4	5	6	7	
18. My spouse does not really provide me with much emotional support.	1	2	3	4	5	6	7	
19. My family provides me with satisfaction and a sense of strength.	1	2	3	4	5	6	7	
20. Even when I feel bad about myself, my friends can cheer me up and make me feel important.	1	2	3	4	5	6	7	
21. I have friends who will support me no matter what I do.	1	2	3	4	5	6	7	
22. I often feel that my friends will be nice to me regardless of what I am doing or feeling.	1	2	3	4	5	6	7	
23. My neighbors make me feel that I am cared about.	1	2	3	4	5	6	7	
24. My interactions with my neighbors make me feel important.	1	2	3	4	5	6	7	
25. I can always count on my neighbors to help me when I am distressed.	1	2	3	4	5	6	7	
26. I often feel that I don't have as much support from people living near me as I would like.	1	2	3	4	5	6	7	

Appendix I
Psychosocial Network Inventory

Psychosocial Network Inventory

Instruction Sheet

1. Complete the General Information
2. List by first names or initials all persons who are IMPORTANT in your life at this moment, whether you like them or not. These persons may be, for example, family members, relatives, friends, neighbors, workmates, clergy, bosses, recreational associates.

Use your own definition of who is important, and place people in whatever category you consider appropriate.

To begin, list each person in the appropriate category and also fill in sex, years known and relationship to you (e.g., father, husband, friend's wife, co-worker, neighbor, boss, employee). When you have completed this on the attached work sheet go on to the next step (3). If you have more people in a category than there are lines, use the extra space provided under others (c).

3. Refer to the attached scales on page 2. The scales are lettered and the letters correspond to the column headings on the work sheet. Each scale has 5 possible choices. For each person you have listed, look at each scale and select the choice that best describes your relationship to that person. Mark your choice (numbers 1 through 5) in the appropriate boxes on the Inventory Work Sheet after the name or initials of the person listed. Repeat the process until all persons listed have been assessed on all 6 scales. Below is a sample illustrating what this might look like when you have finished.

Name or Initial	Sex	Years Known	Relationship	F	H	C	K	T	S	D
Joe	M	27	father	5	4	3	4	3	3	1
Bob	M	5	husband	4	3	5	5	4	5	5
Nancy	F	9	friend	5	4	5	5	3	5	5
Mark	M	4	Nancy's husband	3	2	3	4	3	2	5
Sue	F	2	co-worker	4	2	5	3	3	2	4
Carol	F	1	Boss	2	1	5	3	2	1	1
Karen	F	3	neighbor	4	3	4	4	4	3	5

Scales

- F. Indicate the KIND of feelings and thoughts you have toward this person, regardless of their strength.
5. All positive
 4. Mostly positive
 3. About equally mixed
 2. Mostly negative
 1. All negative
- H. Indicate the degree to which this person may help you by providing EMOTIONAL SUPPORT when you may need it.
5. Very frequently
 4. Often
 3. On some occasions
 2. Rarely
 1. Not at all
- C. Indicate how often you have CONTACT with this person: face-to-face, by phone or by letter.
5. Usually daily
 4. Usually at least once a week
 3. Usually at least once a month
 2. Usually at least once every 6 months
 1. Usually at least once a year
- K. Indicate the KIND of feelings and thoughts this person has toward you, regardless of their strength.
5. All positive
 4. Mostly positive
 3. About equally mixed
 2. Mostly negative
 1. All negative
- I. Indicate the STRENGTH of the feelings and thoughts this person has toward you, regardless of their kind.
5. Very strong
 4. Strong
 3. Moderate
 2. Mild
 1. Weak
- S. Indicate overall, how SUPPORTIVE you consider this person to you.
5. Extremely supportive
 4. Highly supportively
 3. Somewhat supportive
 2. Slightly supportive
 1. Not at all supportive

D. Indicate how far away from you that this person lives.

5. Within the same building.
4. Within 2 or 3 buildings.
3. Within 2 blocks.
2. Within 10 blocks.
1. Greater than 10 blocks from my home.

Work Sheet

Please estimate the time it takes to complete this form: _____ Minutes

b. Sex: Male _____ Female _____ c. Age _____

d. Marital Status: Never married _____ Divorced _____ Married _____
Widowed _____ Separated _____

e. Who is the most important male in your life (first name or initials)? _____

f. Who is the most important female in your life (first name or initials)? _____

[illegible]

[illegible]

[illegible]

Appendix J
Life Events Scale

INSTRUCTIONS

On the enclosed Life Experiences Survey sheet, please indicate which (if any) of the experiences you have had during the past year. If you have had the experience within the past 0-6 months, place a check in the box corresponding to 0-6 months for that experience. If you had the experience 7-12 months ago, place a check in the box corresponding to 7-12 months for that experience. In addition, for any of the experiences which you have checked either 0-6 months or 7-12 months, please rate that experience on the scale of "extremely negative" to "extremely positive," depending on how you feel about the experience, by placing a check in the box which best describes your own feelings. If you have not had a particular experience within the past year, just disregard that experience and mark only those experiences which you have had. You may not have had any of these experiences, you may have had just a few of them, or you may have had many of them. Please check only those which apply to the experiences you have had in the past year, but please be sure to check all of the experiences which you have had in the past year (as well as when you had the experience and your feeling about the experience).

EXAMPLE:

If, for instance, you were married eight months ago and you have experienced a change in your sleeping habits within the past two months, you might fill out the Survey as follows (depending on how those experiences would affect you personally):

1. Marriage
2. Detention in jail or comparable institution
3. Death of spouse
4. Major change in sleeping habits (much more or much less sleep)

0 to 6 mo.	7 mo. to 1 yr.	Extremely negative -3	Moderately negative -2	Somewhat negative -1	No impact 0	Slightly positive +1	Moderately positive +2	Extremely positive +3
	✓							✓
✓			✓					

THE LIFE EXPERIENCES SURVEY

INSTRUCTIONS

Listed below are a number of events which sometimes bring about change in the lives of those who experience them and which necessitate social readjustment. Please check those events which you have experienced in the recent past and indicate the time period during which you have experienced each event. Be sure that all check marks are directly across from the items they correspond to.

Also, for each item checked below, please indicate the extent to which you viewed the event as having either a positive or negative impact on your life at the time the event occurred. That is, indicate the type and extent of impact that the event had. A rating of -3 would indicate an extremely negative impact. A rating of 0 suggests no impact either positive or negative. A rating of +3 would indicate an extremely positive impact.

Section I

1. Marriage
2. Detention in jail or comparable institution
3. Death of spouse
4. Major change in sleeping habits (much more or much less sleep)

0 to 6 mo.	7 mo. to 1 yr.	Extremely negative -3	Moderately negative -2	Somewhat negative -1	No impact 0	Slightly positive +1	Moderately positive +2	Extremely positive +3

- [illegible]

29. Major change in usual type and/or amount of recreation
30. Borrowing more than \$10,000 (buying home, business, etc.)
31. Borrowing less than \$10,000 (buying car, TV, getting school loan, etc.)
32. Being fired from job
33. Male: Wife/girlfriend having abortion
34. Female: having abortion
35. Major personal illness or injury
36. Major change in social activities, e.g. parties, movies, visiting (increased or decreased participation)
37. Major change in living conditions of family (building new home, remodeling, deterioration of home, neighbourhood, etc.)
38. Divorce
39. Serious injury or illness of close friend
40. Retirement from work
41. Son or daughter leaving home (due to marriage, college, etc.)
42. Ending of formal schooling
43. Separation from spouse (due to work, travel, etc.)

[illegible]

7 mo.
to
1 yr.

Extremely
negative

Moderately
negative

Somewhat
negative

No impact

Slightly
positive

Moderately positive

Extremely positive

-3

-2

-1

0

+1

+2

+3

girlfriend

Other recent experiences which have had an impact on your life. List and rate.

48. _____

49.

50. _____

Section II STUDENT ONLY

51. Beginning a new school experience at a higher academic level (college, graduate school, professional school, etc.)

52. Changing to a new school at same academic level (undergraduate, graduate, etc.)

53. Academic probation

54. Being dismissed from dormitory or other residence

[illegible]

7 mo.
to
1 yr.

Extremely
positive

+3

- | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|
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Appendix K
Measure of Daily Hassles

THE HASSLES SCALE

Directions: Hassles are irritants that can range from minor annoyances to fairly major pressures, problems, or difficulties. They can occur few or many times.

Listed in the center of the following pages are a number of ways in which a person can feel hassled. First, circle the hassles that have happened to you in the past month. Then look at the numbers on the right of the items you circled. Indicate by circling a 1, 2, or 3 how SEVERE each of the circled hassles has been for you in the past month. If a hassle did not occur in the last month do NOT circle it.

HASSLES	SEVERITY		
	1. Somewhat severe		
	2. Moderately severe		
	3. Extremely severe		
(1) Misplacing or losing things	1	2	3
(2) Troublesome neighbors	1	2	3
(3) Social obligations	1	2	3
(4) Inconsiderate smokers	1	2	3
(5) Troubling thoughts about your future	1	2	3
(6) Thoughts about death	1	2	3
(7) Health of a family member	1	2	3
(8) Not enough money for clothing	1	2	3
(9) Not enough money for housing	1	2	3
(10) Concerns about owing money	1	2	3

HASSLES	SEVERITY		
	1. Somewhat severe		
	2. Moderately severe		
	3. Extremely severe		
(11) Concerns about getting credit	1	2	3
(12) Concerns about money for emergencies	1	2	3
(13) Someone owes you money	1	2	3
(14) Financial responsibility for someone who doesn't live with you	1	2	3
(15) Cutting down on electricity, water, etc.	1	2	3
(16) Smoking too much	1	2	3
(17) Use of alcohol	1	2	3
(18) Personal use of drugs	1	2	3
(19) Too many responsibilities	1	2	3
(20) Decisions about having children	1	2	3
(21) Non-family members living in your house	1	2	3
(22) Care for pet	1	2	3
(23) Planning meals	1	2	3
(24) Concerned about the meaning of life	1	2	3
(25) Trouble relaxing	1	2	3
(26) Trouble making decisions	1	2	3
(27) Problems getting along with fellow workers	1	2	3
(28) Customers or clients give you a hard time	1	2	3
(29) Home maintenance (inside)	1	2	3
(30) Concerns about job security	1	2	3
(31) Concerns about retirement	1	2	3
(32) Laid off or out of work	1	2	3

HASSLES

SEVERITY

1. Somewhat severe
2. Moderately severe
3. Extremely severe

(33) Don't like current work duties	1	2	3
(34) Don't like fellow workers	1	2	3
(35) Not enough money for basic necessities	1	2	3
(36) Not enough money for food	1	2	3
(37) Too many interruptions	1	2	3
(38) Unexpected company	1	2	3
(39) Too much time on hands	1	2	3
(40) Having to wait	1	2	3
(41) Concerns about accidents	1	2	3
(42) Being lonely	1	2	3
(43) Not enough money for health care	1	2	3
(44) Fear of confrontation	1	2	3
(45) Financial security	1	2	3
(46) Silly practical mistakes	1	2	3
(47) Inability to express yourself	1	2	3
(48) Physical illness	1	2	3
(49) Side effects of medication	1	2	3
(50) Concerns about medical treatment	1	2	3
(51) Physical appearance	1	2	3
(52) Fear of rejection	1	2	3
(53) Difficulties with getting pregnant	1	2	3
(54) Sexual problems that result from physical problems	1	2	3

HASSLES

SEVERITY

1. Somewhat severe
2. Moderately severe
3. Extremely severe

(55) Sexual problems other than those resulting from physical problems	1	2	3
(56) Concerns about health in general	1	2	3
(57) Not seeing enough people	1	2	3
(58) Friends or relatives too far away	1	2	3
(59) Preparing meals	1	2	3
(60) Wasting time	1	2	3
(61) Auto maintenance	1	2	3
(62) Filling out forms	1	2	3
(63) Neighborhood deterioration	1	2	3
(64) Financing children's education	1	2	3
(65) Problems with employees	1	2	3
(66) Problems on job due to being a woman or man	1	2	3
(67) Declining physical abilities	1	2	3
(68) Being exploited	1	2	3
(69) Concerns about bodily functions	1	2	3
(70) Rising prices of common goods	1	2	3
(71) Not getting enough rest	1	2	3
(72) Not getting enough sleep	1	2	3
(73) Problems with aging parents	1	2	3
(74) Problems with your children	1	2	3
(75) Problems with persons younger than yourself	1	2	3
(76) Problems with your lover	1	2	3

HASSLES	SEVERITY		
	1.	2.	3.
	Somewhat severe		
	Moderately severe		
	Extremely severe		
(77) Difficulties seeing or hearing	1	2	3
(78) Overloaded with family responsibilities	1	2	3
(79) Too many things to do	1	2	3
(80) Unchallenging work	1	2	3
(81) Concerns about meeting high standards	1	2	3
(82) Financial dealings with friends or acquaintance.	1	2	3
(83) Job dissatisfactions	1	2	3
(84) Worries about decisions to change jobs	1	2	3
(85) Trouble with reading, writing, or spelling abilities	1	2	3
(86) Too many meetings	1	2	3
(87) Problems with divorce or separation	1	2	3
(88) Trouble with arithmetic skills	1	2	3
(89) Gossip	1	2	3
(90) Legal problems	1	2	3
(91) Concerns about weight	1	2	3
(92) Not enough time to do the things you need to do.	1	2	3
(93) Television	1	2	3
(94) Not enough personal energy	1	2	3
(95) Concerns about inner conflicts	1	2	3
(96) Feel conflicted over what to do	1	2	3
(97) Regrets over past decisions	1	2	3
(98) Menstrual (period) problems	1	2	3
(99) The weather	1	2	3
(100) Nightmares	1	2	3

HASSLES

SEVERITY

1. Somewhat severe
2. Moderately severe
3. Extremely severe

(101)	Concerns about getting ahead	1	2	3
(102)	Hassles from boss or supervisor	1	2	3
(103)	Difficulties with friends	1	2	3
(104)	Not enough time for family	1	2	3
(105)	Transportation problems	1	2	3
(106)	Not enough money for transportation	1	2	3
(107)	Not enough money for entertainment and recreation	1	2	3
(108)	Shopping	1	2	3
(109)	Prejudice and discrimination from others	1	2	3
(110)	Property, investments or taxes	1	2	3
(111)	Not enough time for entertainment and recreation	1	2	3
(112)	Yardwork or outside home maintenance	1	2	3
(113)	Concerns about news events	1	2	3
(114)	Noise	1	2	3
(115)	Crime	1	2	3
(116)	Traffic	1	2	3
(117)	Pollution	1	2	3

HAVE WE MISSED ANY OF YOUR HASSLES? IF SO, WRITE
THEM IN BELOW:

(118)	_____	1	2	3
-------	-------	---	---	---

ONE MORE THING: HAS THERE BEEN A CHANGE IN YOUR
LIFE THAT AFFECTED HOW YOU ANSWERED THIS SCALE?

IF SO, TELL US WHAT IT WAS:

Appendix L
Neighborhood Questionnaire

SECTION II: NEIGHBORHOOD

1. How satisfied are you with your neighborhood?

1	2	3	4	5	6	7
Not satisfied						Very satisfied

2. How crowded is your neighborhood?

1	2	3	4	5	6	7
Not crowded						Very crowded

3. How noisy is your neighborhood?

1	2	3	4	5	6	7
Not noisy						Very noisy

4. How friendly is your neighborhood?

1	2	3	4	5	6	7
Not friendly						Very friendly

5. How busy is your neighborhood?

1	2	3	4	5	6	7
Not busy						Very busy

6. To what extent do you and your neighbors do things together?

1	2	3	4	5	6	7
Never						Often

7. How often do you see people that you know (e.g. in your yard, on the sidewalk, street, etc.) ?

1	2	3	4	5	6	7
Never						Often

8. How often do you see people you don't know (e.g. in your yard, on the sidewalk, street, etc.)?

1	2	3	4	5	6	7
Never						Often

9. How comfortable do you feel;

(a) borrowing things from neighbors?

1	2	3	4	5	6	7
Uncomfortable						Comfortable

(b) entertaining neighbors in your home?

1	2	3	4	5	6	7
Uncomfortable						Comfortable

(c) talking with neighbors in your yard?

1	2	3	4	5	6	7
Uncomfortable						Comfortable

(d) talking with strangers in your yard?

1	2	3	4	5	6	7
Uncomfortable						Comfortable

(e) talking with neighbors on the sidewalk?

1	2	3	4	5	6	7
Uncomfortable						Comfortable

(f) talking with strangers on the sidewalk?

1	2	3	4	5	6	7
Uncomfortable						Comfortable

(g) asking neighbors to watch your house while you are on vacation?

1	2	3	4	5	6	7
Uncomfortable						Comfortable

10. To what extent do you experience the following;

(a) talking with neighbors when you don't want to see or talk to them?

1	2	3	4	5	6	7
Never						Often

(b) talking with strangers when you don't want to see or talk to them?

1	2	3	4	5	6	7
Never						Often

(c) unexpected interactions with neighbors outside your home (e.g. yard, sidewalk, street, etc.)?

1	2	3	4	5	6	7
Never						Often

(d) unexpected interactions with strangers outside your home (e.g. yard, sidewalk, street, etc.)?

1	2	3	4	5	6	7
Never						Often

(e) problems determining when you talk with neighbors outside your home (e.g. yard, sidewalk, street, etc.)?

1	2	3	4	5	6	7
Never						Often

(f) problems determining when you talk with strangers outside your home (e.g. yard, sidewalk, street, etc.)?

1	2	3	4	5	6	7
Never						Often

11. Do you have problems maintaining privacy inside your home?

Yes _____ No _____

12. When sitting on the porch in front of your home, how much privacy do you have?

1	2	3	4	5	6	7
Never						A lot

13. How often are you bothered by:

(a) Noise from automobiles?

1	2	3	4	5	6	7
Never						A lot

(b) Noise from airplanes?

1	2	3	4	5	6	7
Never						A lot

(c) Noise from neighbors (e.g. arguments, parties, etc.)?

1	2	3	4	5	6	7
Never						A lot

(d) Air pollution?

1	2	3	4	5	6	7
Never						A lot

(e) Feelings of being crowded?

1	2	3	4	5	6	7
Never						A lot

(f) Fear of crime?

1	2	3	4	5	6	7
Never						A lot

(g) People parking in front of your home?

1	2	3	4	5	6	7
Never						A lot

(h) Traffic?

1	2	3	4	5	6	7
Never						A lot

(i) People walking on your yard?

1	2	3	4	5	6	7
Never						A lot

(j) Neighbor's pets?

1	2	3	4	5	6	7
Never						A lot

(*) Trash thrown on your lawn?

1	2	3	4	5	6	7
Never						A lot

14. To what extent do you agree or disagree with the following?

	Strongly Agree	Agree	Don't Know	Disagree	Strongly Disagree
a. Neighborhoods should be quiet	1	2	3	4	5
b. One doesn't have very much control over what happens in a neighborhood	1	2	3	4	5
c. Neighborhood life is always hectic; it just has to be that way	1	2	3	4	5
d. People can regulate what happens to them in their neighborhoods.	1	2	3	4	5
e. The primary problems in neighborhood living are related to sharing a common space.	1	2	3	4	5
f. The primary problems in neighborhood living are related to living with many people	1	2	3	4	5
g. It is often not worth the effort to try to change the way things are.	1	2	3	4	5
h. In neighborhood living, it is worth while to try to structure your interaction with others.	1	2	3	4	5

15. Whenever three or more people live near each other, each of them feels that the others leave him or her out of things sometimes. While some of this is to be expected, some may feel left out more often than the others. Please rate how often you feel left out by your neighbors:

1	2	3	4	5	6	7
Less often than one would expect						More often than one would expect

Do you feel that your neighbors leave you out of things? _____

How often?

1	2	3	4	5	6	7
Never						Often

16. Problems that neighbors encounter generally involve managing new situations. No one can control everything that happens to her or him. For each of the following types of problems, indicate the degree to which you feel you have encountered and solved this problem, and the ultimate reasons for this.

a. Problems controlling what happens in my neighborhood.

Extent of problem for you:

1	2	3	4	5	6	7
No problem at all						A big Problem

Have you solved this problem?

____ Yes ____ No

If no, is it because: _____ The situation does not lend itself to being solved
 _____ You don't know how to solve the problem
 _____ You haven't tried hard enough to solve the problem
 _____ You are not the kind of person who can solve it

b. Problems controlling what happens out front of where I live.

Extent of problem for you:

1	2	3	4	5	6	7
No problem at all						A big Problem

Have you solved this problem?

____ Yes ____ No

If no, is it because: _____ The situation does not lend itself to being solved
 _____ You don't know how to solve the problem
 _____ You haven't tried hard enough to solve the problem
 _____ You are not the kind of person who can solve it

c. Problems running into people on your street when you don't want to see them.

Extent of problem for you:

1	2	3	4	5	6	7
No problem at all						A big Problem

Have you solved this problem?

____ Yes

____ No

If no, is it because: ____ The situation does not lend itself to being solved.
 ____ You don't know how to solve the problem.
 ____ You haven't tried hard enough to solve the problem.
 ____ You are not the kind of person who can solve it.

17. How much do you decorate your yard (e.g., flowers, painting, etc.)?

1	2	3	4	5	6	7
None						A lot

18. How often do you do things with your neighbors?

1	2	3	4	5	6	7
Often						Never

19. Do you often include your neighbors in things you do?

____ Yes

____ No

20. How much do you have in common with your neighbors?

1	2	3	4	5	6	7
Nothing						A lot

21. How much do you enjoy the company of your neighbors?

1	2	3	4	5	6	7
Not at all						A lot

22. How much time would you like to spend with your neighbors?

1	2	3	4	5	6	7
A lot less time			The same amount of time as now			A lot more time

23. How much do you like your neighbors?

1	2	3	4	5	6	7
Not at all						A lot

Appendix M
Perceived Stress Scale

The questions in this scale ask you about your feelings and thoughts during the last month. In each case, you will be asked to indicate how often you felt or thought a certain way. Although some of the questions are similar, there are differences between them and you should treat each one as a separate question. The best approach is to answer each question fairly quickly. That is, don't try to count up the number of times you felt a particular way, but rather indicate the alternative that seems like a reasonable estimate.

1. In the last month, how often have you been upset because of something that happened unexpectedly?

0 1 2 3 4
never almost never sometimes fairly often very often

2. In the last month, how often have you felt that you were unable to control the important things in your life?

0 1 2 3 4
never almost never sometimes fairly often very often

3. In the last month, how often have you felt nervous and "stressed?"

0 1 2 3 4
never almost never sometimes fairly often very often

4. In the last month, how often have you dealt successfully with irritating life hassles?

0 1 2 3 4
never almost never sometimes fairly often very often

5. In the last month, how often have you felt that you were effectively coping with important changes that were occurring in your life?

0 1 2 3 4
never almost never sometimes fairly often very often

6. In the last month, how often have you felt confident about your ability to handle your personal problems?

0 1 2 3 4
never almost never sometimes fairly often very often

7. In the last month, how often have you felt that things were going your way?

0 1 2 3 4
never almost never sometimes fairly often very often

8. In the last month, how often have you found that you could not cope with all the things that you had to do?

0	1	2	3	4
never	almost never	sometimes	fairly often	very often

9. In the last month, how often have you been able to control irritations in your life?

0	1	2	3	4
never	almost never	sometimes	fairly often	very often

10. In the last month, how often have you felt that you were on top of things?

0	1	2	3	4
never	almost never	sometimes	fairly often	very often

11. In the last month, how often have you been angered because of things that happened that were outside of your control?

0	1	2	3	4
never	almost never	sometimes	fairly often	very often

12. In the last month, how often have you found yourself thinking about things that you have to accomplish?

0	1	2	3	4
never	almost never	sometimes	fairly often	very often

13. In the last month, how often have you been able to control the way you spend your time?

0	1	2	3	4
never	almost never	sometimes	fairly often	very often

14. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?

0	1	2	3	4
never	almost never	sometimes	fairly often	very often

Appendix N
Amine-producing Foods Checklist

Please circle any of the following items which you consume during the 15-hour urine collection period:

Coffee, tea, coca cola.

Chocolate, cocoa, wine, beer, alcohol, decaffeinated coffee.

Breads containing raisins, prunes, orange peel, banana or pineapple.

Cheese bread, nut bread containing walnuts.

Raisin bran.

Desserts containing walnuts, sour cream or fruits, such as fruit cake, plum pudding, mince pie.

Desserts containing chocolate, coffee or alcohol.

Banana, avocado, pineapple, canned figs, raisins, plums and prunes.

Oranges, orange juice, fruit cocktail with pineapple.

Tomato, broad beans (fava beans), eggplant or any vegetable in cheese sauce.

Chicken liver, herring, smoked or pickled fish, brain, aged cheese, sour cream, anchovies.

Cheese omelets, spanish omelets with aged cheese.

Macaroni and cheese, spaghetti in tomato sauce.

Walnuts, chocolate or coffee flavored candy, candy containing walnuts.

Catsup, chili sauce, olives, vanilla.

Appendix O

Urinary Catecholamine Assay Procedure

Catecholamine Assay

Durrett and Ziegler (1980) have described a sensitive radioenzymatic technique of quantifying the catecholamines epinephrine and norepinephrine in body tissues and fluids. This assay converts catechols to their radioisotope-labeled amine metabolites. After a reaction mix has been added and this conversion initiated, samples are incubated for about 90 minutes, and the reaction is stopped. Next, the samples undergo organic solvent extraction in order to separate catecholamine metabolites from excess radioisotope that may be present. The metabolites produced by the reaction are then separated by chromatographic procedures and remaining radioactivity is measured. This radioactivity is used to determine the concentration of each catecholamine present in the original sample. A reference curve based on known concentrations of standards is used to obtain concentrations of unknowns.

The procedure used in the current study is performed as follows:

Reagents

1. Stock Standards

Norepinephrine (N) D,L-Norepinephrine HCl, MW=205.7
(MW=169.2)

(-)-Norepinephrine Bitartrate (hydrate),
MW=337.3

L-Arterenol Bitartrate (hydrate - 1.5
H₂O/mole) MW=319.3

Epinephrine (E) L-Epinephrine Bitartrate, MW=333.3
(MW=183.2)

Dopamine (D) 3-Hydroxytyramine HCl, MW=189.7
(MW=153.2)

A. 1 mg/ml in 0.2 N HAc

Prepare 10 ml of each (N, E, & D) separately and store in refrigerator.

B. 100 ug/ml NED combination for "NED-A" Aliquots

Combine 0.5 ml of each standard (N+E+D, 1 mg/ml in 0.2 N HAc).
Add 3.5 ml 0.2 N HAc.

Aliquot 100 ul into a series of 14 ml polypropylene tubes labeled "NED-A" and store in freezer. (10 ug of NED/100 ul)

C. Prepare further dilutions for standard curve from dilution A.

Standard Dilutions

100 pg=100 ul NED-A + 9.9 ml 0.01 N HCl. Add 10 ul to appropriate tube.
500 pg=100 ul NED-A + 1.9 ml 0.01 N HCl. Add 10 ul to appropriate tube.
1000 pg=100 ul NED-A + 0.9 ml 0.01 N HCl. Add 10 ul to appropriate tube.
2000 pg=100 ul NED-A + 0.4 ml 0.01 N HCl. Add 10 ul to appropriate tube.
4000 pg=100 ul NED-A + 0.15ml 0.01 N HCl. Add 10 ul to appropriate tube.

2. O-BHA 31.9 mg O-Benzylhydroxylamine Hydrochloride/10 ml

3. TEM pH 8.3
 -0.09 M $MgCl_2$ ($MgCl_2 \cdot 6H_2O$, 4.57 g/250 ml) MW=203.3
 -20 mM EGTA (ethylene glycol-bis-(B-amino-ethyl ether)
 N,N'-tetraacetic acid, 1.9 g/250 ml) MW=380.4
 -0.2 M TRIS (6.1 g/250 ml) MW=121.1
 -adjust pH with HCl
 -will go into solution once TRIS is added
4. 0.75 M Borate buffer with 25 mg/ml EDTA, pH 10
 -11.59 g Boric Acid crystal + 6.25 g EDTA
 -add NaOH until pH 10
 -adjust total volume to 250 ml
5. 1% Tetraphenylboron (TPB)
 -1.0 g/100 ml in GDW
6. Cold Carriers
 1 mg/ml of each in 0.01 N HCl:
 Normetanephine NME·HCl 120 mg/100 ml
 Metanephine ME·HCl 118.6 mg/100 ml
 3-Methoxytyramine 3MT·HCl 120 mg/100 ml
7. 3:2 Toluene : Isoamyl alcohol (2400 ml toluene: 1600 ml
 isoamyl alcohol)
8. 0.1 N HAc (Acetic Acid 99.5%, 5.7 ml/L)
9. Cold Carrier + Ethanol/HCl 5ml H_2O + 100 ml ethanol
 + 10 ul 1 N HCl + 32 mg NME·HCl + 31 Mg ME·HCl
 + 32 mg 3MT·HCl.
 Add H_2O + HCl to cold carriers to dissolve. Then add ETOH.
10. Ethylamine Solvent (prepare fresh for each chromatography jar)
 -80 ml Chloroform
 -15 ml Ethanol
 -10 ml Ethylamine
11. 2 N NH_4OH 135 ml/L of 28% solution
12. 4% $NaIO_4$ freshly prepared (0.4g/10 ml)
13. 10% Glycerol keep refrigerated
14. 10 N Acetic Acid 288 ml/500 ml of 99.5% (glacial)
15. "Phosphor-Only" 240 ml PPO-POPOP in 4 liters toluene
16. .05 N NH_4OH
17. "TIAL"
 -2100 ml toluene
 - 900 ml isoamyl alcohol
 - 150 ml fluor (PPO-POPOP)

PROCEDURE

1. Pipette 100 ul aliquot for two replicates of each sample into 14 ml round bottom polypropylene tubes. Make 1:100 dilution of 100 ul urine aliquots with GDW.
2. Blanks - 100 ul fluid in one tube (i.e., blank tube)
200 ul COMT mix in second tube
Controls - 100 ul fluid
Standards - various concentrations of N, E, D added to 100 ml
3. Keep samples on ice.
4. Add 10 ul 0.01 N HCl to each sample.
5. Add 100 ul of COMT incubation mix to each tube:
Mix = 1 ul O-BHA
84 ul TEM
0.6 mg/ml glutathione (reduced)
5 ul ³H-SAM
10 ul COMT
Incubate for 90 minutes at 37 degrees Celsius.
6. Return tubes to ice. Add 200 ul 0.75 Borate buffer with 25 mg/ml EDTA (pH 10) to each tube.
7. Add 50 ul cold carrier to each tube and vortex.
8. Add 50 ul 1% TPB and vortex.
9. Add 7 ml 3:2 toluene : isoamyl alcohol to each tube, cap, and shake for 5 minutes. Centrifuge at 3000 RPM for 5 minutes and uncap.
10. Place tubes in a dry ice/ethanol bath to freeze aqueous layer. Decant organic phase into 14 ml polypropylene tubes containing 250 ul of 0.1 N acetic acid.
11. Cap and shake for 5 minutes. Centrifuge at 3000 RPM for 5 minutes and uncap.
12. Aspirate organic phase. Wash remaining aqueous layer with 3 ml 3:2 toluene : isoamyl alcohol. Recap tubes, shake 5 minutes and centrifuge at 3000 RPM for 5 minutes and uncap.
13. Aspirate organic phase. Freeze samples in -70 degree Celsius freezer. Turn on refrigerator in lyophilizer to 0 degree Celsius or lower.
14. Put samples in shelf chamber and lyophilize aqueous layer of tubes.

THIN LAYER CHROMATOGRAPHY OF METHYLATED PRODUCTS

1. Remove samples from lyophilizer.
2. Add 50 μ l cold carrier + HCl/ethanol solution and centrifuge for 30 seconds at 3000 RPM.
3. Spot solution onto prescored silica gel TLC plates with fluorescent indicator.
4. Add 50 μ l cold carrier + HCl/ethanol solution again as in 2 above, but refrain from centrifugation.
5. Develop plates in hood in TLC jars containing thylamine solvent system. Line jars with chromatography paper to equalize solvent vapor.
6. Visualize spots on plate using U.V. light and mark with a soft pencil.
7. Scrape the 3 methoxytyramine, normetanephrine, and metanephrine spots into separate 7 ml liquid scintillation vials.

COUNTING OF DOPAMINE (non-beta-hydroxylated product)

1. Add 1 ml 0.05 N NH_4OH to each vial, cap, and shake slowly for 15 minutes.
2. Add 5 ml "TIAL," cap, shake vigorously and count 5 minutes per vial. (Be sure to let samples sit in the counter, in the dark for about 4 hours before beginning to count in order to minimize chemiluminescence.

COUNTING OF EPINEPHRINE AND NOREPINEPHRINE (beta-hydroxylated products)

1. Add 1 ml 2 N NH_4OH to each counting vial and shake for 15 minutes.
2. Add 50 μ l freshly prepared 4% NaIO_4 to each vial.
3. After 5 minutes stop the reaction by adding 50 μ l 10% glycerol to each vial.
4. Add 200 μ l 10 N acetic acid to each vial.
5. Add 5 ml "Phospho-Only," cap, shake vigorously and count 5 minutes per vial. (Be sure to let samples sit in the counter, in the dark for about 4 hours before beginning to

count in order to minimize chemiluminescence.

6. Plot standard curve and evaluate unknowns.

Appendix P
Background Data

Name _____

Address _____

Phone # _____

Section I: Background Data

1. Where did you grow up? _____
2. What is your marital status? _____

_____ Single	
_____ Married	How long? _____
_____ Separated	
_____ Divorced	
_____ Widowed	How long? _____
- 3.a) If you were previously married, how long were you married? _____
- b) How long have you been widowed, separated or divorced? _____
4. What is your current family size? _____
5. Family size when growing up? _____
6. Number of brothers and sisters (including living and deceased)? _____
7. Number of family members living in the Milwaukee area? _____
8. If you have family members in the area, approximately how close do they live? _____
9. Are these your parents, brothers, sisters? Please specify. _____

10. Your highest education level: _____

_____ Grammar School	
_____ High School (Grade)	_____
_____ Some College	
_____ College Degree	
_____ Graduate Work	
_____ Other (specify)	_____
11. Highest education level obtained by your spouse? _____

_____ Grammar School
_____ High School
_____ Some College
_____ College Degree
_____ Graduate Work
_____ Other
12. Highest education level obtained by your mother? _____

_____ Grammar School
_____ High School
_____ Some College
_____ College Degree
_____ Graduate Work
_____ Other

13. Highest level of education obtained by your father? ☐ Grammar School
☐ High School
☐ Some College
☐ College Degree
☐ Graduate Work
☐ Other (specify) _____

14. Number of people living at your residence _____

15. Type of residence: ☐ Apartment
☐ Single Family home
☐ Two Family home
☐ Three Family home
☐ Townhouse
☐ Other (specify) _____

16. Do you own or rent? _____

17. Approximate annual income: ☐ Under \$10,000/year
☐ \$10,000 - \$15,000/year
☐ \$15,000 - \$20,000/year
☐ \$20,000 - \$30,000/year
☐ \$30,000 - \$40,000/year
☐ \$40,000 - \$50,000/year
☐ over \$50,000/year

18. Your occupation _____

19. Spouse's occupation _____

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